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ELECTRIC RAILWAY TRACTION

A Supplement illustrating and describing developments in Electric Railway Traction is presented with each copy of this week's issue.

Two L.N.E.R. Losses

IN the closing days of last week the London & North Eastern Railway sustained two losses which will be regretted far more widely than in that company alone. On January 27 the death occurred of Mr. James McLaren, the Secretary; and on January 29 there died a member of the board whose name was respected in many circles of public life—Sir Charles Batho. Mr. McLaren, an obituary notice of whom appears on page 223, had been concerned with the secretaryship of the L.N.E.R. since its formation, first as Joint Secretary with Mr. G. F. Thurston from 1923-25, and thenceforth as Secretary. From 1918-22 he had been Secretary of the former North British Railway. In addition to his normal secretarial duties, Mr. McLaren had control of all the company's cash offices, and of the Registration Office, the latter involving the affairs of approximately 174,000 stockholders, apart from the holders of £119,485,848 of debenture stock. Mr. McLaren, a very popular personality, took an active and constructive interest in staff welfare and recreations that will be much missed. Sir Charles Batho, whose public and railway services are referred to on page 225, represented East Anglia on the L.N.E.R. board, and was Chairman of the English Hotels Committee and a member of several others, besides the Southern and North Eastern Area local boards. Previous to his election as a Director of the L.N.E.R. in 1932, he had been Lord Mayor of London in 1927-28, when his close association with various charities connected with the City of London earned him a wide public esteem. His was a charming personality that brought him popularity both on the railway and in public life. In addition to his official duties as a director, Sir Charles Batho found time to establish a cordial relationship with the staff by his attendance at social functions, where his cheery presence was always welcomed.

* * * *

"Exhibition Train" of Railway Facilities

In its dealings with the organisers of excursions and party travel the L.N.E.R. is turning to good account the exhibition train idea, and many invitations have been issued for visits to a special railway exhibition train of the most modern passenger vehicles, including buffet and restaurant cars, a fully-equipped cinema van, and a display van in which a number of interesting models and photographs depicting modern developments in railway equipment are on view. The tour was inaugurated at York on Wednesday, January 26, and thereafter it is including Hull, Scarborough, Redcar, Middlesbrough, Stockton, Darlington, Ripon, Harrogate, Leeds, Castleford, and Pontefract. Club secretaries and others interested are being shown films of some of the favourite resorts to which excursions are run, and are given the opportunity of exchanging experiences with other organisers, and discussing their plans with railway experts who are in attendance. It is hoped that organisers and arrangers of excursions and trips to the seaside will thus be able to give their committees a full report of the railway facilities and that the work of making plans for the coming season will be very much simplified.

* * * *

The Week's Traffics

Coal contributes £48,500, merchandise £14,500, and passenger train traffic £22,000 to the combined increase of £85,000 in receipts shown by the four main-line railways for the past week. The combined increase for the year to date is £477,000 on aggregate takings of £11,450,000, or 4·35 per cent. Total takings for the past week were L.M.S.R. £1,151,000, L.N.E.R. £872,000, G.W.R. £473,000, and Southern Railway £358,000, representing increases over the corresponding period of last year of £33,000, £29,000, £21,000, and £2,000 respectively.

	4r-l Week				Year to date	
	Pass., &c.	Goods, &c.	Coal, &c.	Total	Inc. or Dec	%
	£	£	£	£	£	
L.M.S.R.	+ 9,000	+ 3,000	+ 21,000	+ 33,000	+ 217,000	+ 4·89
L.N.E.R.	+ 5,000	+ 5,000	+ 19,000	+ 29,000	+ 143,000	+ 4·32
G.W.R.	+ 3,000	+ 8,000	+ 10,000	+ 21,000	+ 81,000	+ 4·39
S.R.	+ 5,000	− 1,500	− 1,500	+ 2,000	+ 36,000	+ 2·61

Great Northern (I) traffics for the past week, totalling £16,000, show an increase of £250; Great Southern, totalling £63,243, an increase of £686; and Belfast and County Down, totalling £2,244, an increase of £83. Mersey Railway receipts total £4,231, an increase of £207, and Liverpool Overhead £1,335, an increase of £144.

* * * *

Internal Airline Future

A new conception of the function of internal airlines in Great Britain, advancing from the widely-held view that their purpose is to speed up journeys where short sea crossings disproportionately extend the time necessary for surface transport, was stated in a resolution placed by Mr. Ashley Hall before the recent Aerodrome Owners' Conference in London. Air transport, he maintained, should provide for such a city as Glasgow the same facility in the matter of journey times to London as now given by

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the railways to Bristol and towns similarly situated. The present airline to Glasgow makes the double sea crossing to Belfast *en route*, and involves a change of machine at Belfast airport. With a journey time of 4 hr. 10 min. each way it could not, even were its hours of departure changed (and the value of its present connections with Continental air services at Croydon thereby lost), provide the time for business at each end postulated by Mr. Ashley Hall. He therefore calls for the establishment of a system of non-stop express airlines between London and the provinces, and between important provincial centres themselves, which, to be commercially attractive, he considers would have to be operated by machines averaging 200 m.p.h. The cruising speed of the Railway Air Services "D.H. 86" machines at present used on the London—Belfast route is 138-42 m.p.h.

* * * *

U.S.A. Earnings and Expenditure

Every year the Committee on Public Relations of the Eastern Railroads in the U.S.A. publishes a wall calendar on which is graphically shown how many days of average gross earnings are necessary to meet the companies' liabilities. Of late, it has been evident that regarded on this basis the year of 365 days is too short, both for the railways to earn a surplus with which to improve their equipment and extend their facilities, and for the service of their dividends. In 1936, the particulars for which are shown on the 1938 calendar now before us, the gross receipts of 157 days were absorbed by wages; of 21 days by fuel requirements; of 55 days by materials and supplies; and of 31 days by all other operating expenses. Of the remaining 101 days, 96 were occupied in earning money for the payment of taxes and fixed charges, and, unfortunately, dividend commitments called for the equivalent of 15 days' receipts when only 5 days remained in which to earn them. Expressed in figures, the total operating receipts of the Class I railways for their transportation services totalled $4,052,734,139, and net miscellaneous income contributed another $109,225,020. But dividends took $169,829,290, and all other expenditure $3,997,329,118, leaving a deficit of $5,199,249.

* * * *

"Tu viens en Provence"

The presence of the Siamese Minister, the Bolivian Chargé d'Affaires, the Counsellor of the Cuban Legation, the Secretary of the Bulgarian Legation, the Counsellor of the Esthonian Legation, the First Secretary of the Turkish Embassy, and the Secretary of the Saudi-Arabian Legation gave some indication of the cosmopolitan interest aroused in a lecture on Provence to foster touring in France which was given recently at the Polytechnic Institute, London, by Professor Boillot, of the University of Bristol. The lecture was organised by the French Railways-National Tourist Office and given under the patronage of the French Ambassador. Professor Boillot, who was introduced to those present by the Comte de Kerdrel, Managing Director of the National Tourist Office, is the author under the pen-name of "Félix de Grand'combe" of several interesting travel books including "Tu viens en France" and "Tu viens en Angleterre." The lecturer, with the aid of his own special collection of lantern slides, gave to his numerous and distinguished audience a vivid impression of the scenic beauties and romantic historical background of this land "where the Courts of Love flourished in the Middle Ages." At the close, Comte de Kerdrel asked the audience to join him in thanking the French Ambassador for having granted his patronage to this function and also the Cannes firm of florists for its graceful gesture in sending the mimosa which was distributed to the ladies present. The guests enumerated above were received by the Comtesse de Kerdrel.

* * * *

An Unusual Accident in the U.S.A.

A rear-end collision occurred on the Louisville & Nashville Railroad on December 24 due to the engine driver's unexpected inability to apply the brake on more than the locomotive and the two immediately following cars. The train, a heavy express, ran into the rear of another which had stopped at Hopkinsville and was loading and unloading passengers, a number of whom were slightly injured. The engine driver discovered that the braking power was defective only upon making a service application of the brake at the caution signal, and it was later found that an angle cock on the second car behind the locomotive had been turned, thus making it impossible to apply the brake to the rest of the train. As the brake had been in good working order at the previous stop it was surmised that some malicious person must have turned the angle cock during the time the train was stationary. This was an accident that, despite all safety precautions, the employees and the company were unable to prevent, but its effects were minimised by the fact that the rear sleeping car on the standing train was unoccupied and that all the cars in both trains were of steel construction. Mr. J. P. Hill, President of the Louisville & Nashville Railroad, in a letter describing the circumstances, remarks that "the better behaviour of steel cars under conditions of this kind is so well settled as compared with wooden cars, that there seems to be no room for discussion about the desirability of having steel cars."

* * * *

The Chicago Belt Railway

The Belt Railway Company, of Chicago, in which thirteen of the principal railways serving the city have a share, was founded in 1882 as the only economical method of dealing with the great complexities of a fast-growing interchange traffic between the many trunk lines operating in the Chicago area. In 1883 the Belt Railway was dealing with an average of about 300 wagons a day. The average increased to 6,000 in 1929 and today it stands at about 5,100. Seventy-five steam locomotives and four 600-horse-power diesel locomotives are utilised for this traffic. It is claimed that Chicago, with 25 trunk lines operating within its boundaries, is today the largest railway centre in the world. The "switching district," covering an area of some 600 square miles and containing 5,900 industries with private sidings, is the largest industrial area in the United States. The Belt Railway itself has 22 miles of main line, and running powers over a further 25 miles of other company's lines. The railway has also more than 300 miles of line in the various yards, about 162 miles of which are in the principal marshalling yard known as Clearing Yard. Alongside the railway are the premises of approximately 450 industrial concerns in and out of whose private sidings some 200,000 loaded wagons are moved annually. At present the company is engaged in modernising Clearing Yard by the installation of mechanical wagon retarders for hump shunting at a cost of $1,500,000. To date about $10,000,000 has been expended on this yard.

* * * *

Reichsbahn Signalling in 1937

The Signal Department of the German State Railway was again busy last year renewing old type installations, either with mechanical equipment of the standard pattern or with all-electric apparatus, including several of the so-called multiple-row power frames, the most important

examples of which were at Bingerbrück, Brackwede, Düsseldorf (Derendorf), Gerstungen, Kassel marshalling yard, and Magdeburg. Lock-and-block has replaced telegraph block on some sections, and a further 50 km. (31 miles) of track on the Berlin Stadtbahn have been equipped with automatic signalling. The new "wait" and "draw forward" signs have been extensively applied, and further sections equipped with three-aspect distant signals at 1,000 m. (1,094 yd.) from the home signals. A.T.C. was again extended, and applied at a number of level crossings to detect the closing of the barriers where fast railcars run. Detection was added to trailing points in main lines where speeds over 135 km.p.h. (84 m.p.h.) are met with. Experiments are still proceeding with a three-aspect home signal in which the present restricted speed two-arm aspect, with two green lights, is replaced by one arm at 45 deg. in the lower quadrant and a flashing yellow light. Standard power-point circuits were agreed on. On several light railway routes improved signalling was put in to permit of higher speeds. Electric signal and point indicator lighting was extended, and improved electric treadles introduced to meet new conditions and enable cancelling releases to be eliminated. Trials with wooden insulated rail joints apparently did not prove satisfactory.

* * * *

Reichsbahn Telephones & Telegraphs in 1937

The German State Railway last year installed 13,000 km. (8,078 miles) of new carrier telephone channels, and a new and cheaper type of apparatus was developed for distances up to 50 km. (31 miles). On other long-distance circuits 180 amplifiers were put in. New local automatic exchanges put in service numbered 146, and remaining portions of the main telephone lines were provided with tone frequency selectors and terminal amplifiers, enabling the local exchange user to dial from one divisional management to another; notification that dialling of the further number can begin is now given by automatic speech announcements instead of Morse signs. To accelerate station working, 85 platform loudspeakers were installed, new designs, including microphones, being introduced. A considerable extension of machine telegraphy was made, totalling 18,000 km. (11,185 miles), and much Hughes apparatus withdrawn. The number of wires necessary for telegraphs has been greatly reduced with the adoption of modern methods. An 18-channel cable connection has been provided from Halle to Nuremberg. Improvements were introduced in switch and cable fittings, and a travelling telegraph and telephone testing van was completed. Much experimental work was also undertaken, including new accident call transmitters, the operation of Morse circuits from mains through rectifiers, and the production of wireless shunting signals of constant strength in the engine cab notwithstanding its movements about the yard.

* * * *

Modern Signalling in Switzerland

On page 216 we publish a short description of the all-electric power signalling at Zurich, Swiss Federal Railways, from which it will be evident that they are in no way behind other lines in the adoption of the most approved methods of working. In some respects, the apparatus does not differ from that used in this country, but in others it has been adapted to the conditions of working favoured in Switzerland, where trailable points are the rule, and shunting is controlled by "stop shunting" signals and point indicators. The locking frame, arranged on the 4-row system, is very compact, allowing 224 levers to be accommodated in a comparatively small box, controlling, as the track diagram seen in the illustration of it shows, a fairly extensive layout. The remaining equipment has also a neat appearance. Power working of the electro-pneumatic type has been in use at Spiez, on the Loetschberg line, for many years, but the all-electric system did not appear in Switzerland until 1920, at Goeschenen on the Gotthard line. Light signals made their appearance in due course, as described in our issue of October 30, 1936, and automatic train control as used in that country was described in our issue of February 16, 1934. As steel sleepers are widely used, there is not much track circuiting, but there are some installations of axle counters. Mechanical signalling is of the double-wire type, with rodding for points in the older installations. Lock-and-block is very generally used, both on double and single lines, and the standard of safety is generally of a high order.

* * * *

Turbine Locomotives

In a report of the Railway Fuel and Travelling Engineers' Association Mr. L. P. Michael, Chief Mechanical Engineer of the Chicago & North Western Railroad, discussed the status of condensing and steam-turbine locomotives. To his knowledge four turbine locomotives were in service, three in Sweden and one in England. All were without the means to vary the ratio between turbine rotor speed and driving wheel speed, and the lack of this was said to result in uneconomic working except at the one speed for which the turbine could run efficiently. On the whole, the turbine locomotive had shown itself to be a rather heavy consumer of fuel for this reason. Everyone acquainted with turbines and their characteristics foresaw this possibility, and already plans are under way for a turbo-electric locomotive and for one having a hydraulic coupling, epicyclic change-speed gearing and hypoic bevel final drive. The turbo-electric locomotive has been ordered by the Union Pacific Railroad from the General Electric Company and it is nearing completion. It is to have a condenser, and altogether it sounds a somewhat heavy and expensive proposition. We hope that the locomotive with mechanical transmission will also materialise, as the high rotor speed of the turbine should enable the fluid coupling and the change-speed gearing to be quite light and compact.

* * * *

Mr. Muhlfeld on Streamlining

Mr. John E. Muhlfeld, who ranks as one of the best-known authorities on locomotive subjects in the United States, in a paper entitled "The Economics of Railway Motive Power and Train Service," delivered himself of a somewhat scathingly adverse opinion of locomotive streamlining. He remarked that when it comes to the reduction of train resistance—which is due to weather, friction, oscillation, condition of the track, grade, curvature and wind—it is of much more importance to overcome frictional and accelerating resistance and gravitational force on up grades, than to reduce air resistance. Experience in the operation of steam locomotives has shown that the quartering or broadside winds create the air resistance that retards train movement, and that streamlining, which is primarily intended to reduce head-on resistance, skin friction, and turbulence, will accomplish little in the way of increasing permissible speed or in the reduction of energy required to haul the train, until a speed of 75 m.p.h. has been reached. With the present-day permissible speeds, and observing a proper degree of safety in railway operation, Mr. Muhlfeld said that "streamlining, colouring, and striping, are mere details of style and novelty, and the ability to increase speed and save fuel by means of them, is inconsequential." It is doubtful whether any of the advocates of streamlining have ever let themselves go to the same extent, albeit in the opposite sense.

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The Truth About James Watt

A SERIES of articles which has just appeared in *The Railway Review*, if allowed to pass without comment, may give rise to a conception of the work and character of James Watt which might later find some credence among a class of railwaymen for whom a just appreciation of Watt is of special significance. The articles were written by Mr. Charles R. King who has delved into the Journals of the House of Commons for the period when the Act of Parliament of 1775 extending Watt's patent for 25 years was under consideration. Mr. King asserts that the attribution of the invention of the separate condenser to Watt is false, that what he " invented " was nothing more than a common pump for compressing the exhaust steam and returning it to the boiler, and that Watt was the tool of financial interests who secured the Act in his name for the purpose of establishing an ill-gotten monopoly of other men's ideas, and especially those of William Blakey, who, Mr. King declares, was the real inventor of the separate condenser. Such an estimate of the famous Boulton-Watt partnership involves so complete a reversal of almost everything that is believed to be the historical truth that a most exhaustive, and, one might add, cold-blooded, analysis of the whole of the known facts, as well as the bringing to light of many new facts, would be necessary to establish it. Mr. King's articles lack both the clarity and the coolness which might predispose one to believe that here is another of the great " exposures " of which literature does contain more than one famous example.

On essential points he is vague. He gives only one passing reference to the actual nature of Blakey's invention, which accords with the known facts, and gives no support to his assertion in the context that it was really the separate condenser. He asserts—and his whole argument rests on the assertion—that no drawing of Watt's invention existed at the time of the original patent, and that the patent specification is open to suspicion. In their Centenary volume, however, Dickinson and Jenkins reproduce the drawing (1769) of the Watt engine which was intended for the patent specification, and which he was advised to omit because at that time the patent law as it related to scientific invention was at an altogether more primitive stage of development. Frequently, Mr. King writes of Watt's patent procedure as if the law was the same then as today. Under present law Watt's specification would be inadmissible, but that fact in itself lends no support to the contention that it is open to suspicion. It was simply framed in accordance with the practice of the time, or what is perhaps more important for a just appreciation of the position, in accordance with the older historical conception of a patent, which had not then fully given place to the more modern scientific concept, and Dickinson and Jenkins also reproduce the drawing which Watt laid before Parliament when the case for the extension of this patent was under consideration. Mr. King's chief discovery appears to be that when the Act of 1775 was before Parliament, William Blakey, who was then in Paris, petitioned the House of Commons against the Act on the grounds that Watt's engine was merely an imitation of his own. Following the record of the petition having been lodged, there is, Mr. King points out, no further mention of it in the Journal of the House of Commons. The most natural conclusion from this, it would have seemed to us, would have been that on closer knowledge of the details of Watt's invention, which admittedly they could not have had from the terms of the specification or the Act alone, Blakey and his adviser did not proceed with the petition.

A great deal of Mr. King's article is taken up with the " exposure " of what he writes of as a deliberate conspiracy of secrecy by the press, the biographers, and the educational authorities, to suppress the facts concerning Watt. We cannot conceive what motive could so universally actuate biographers and editors to conceal the truth regarding Watt at this distance of time, and we leave it to our readers to judge how much importance is to be attached to this aspect of Mr. King's case. Our own feeling is that before launching an attack of this kind it is a writer's duty to establish his case and, in particular, to explain why all the essential facts hitherto known have been misinterpreted and how they fit in with the new interpretation. The selection of one or two passages from letters and such like is altogether insufficient. There is no doubt that the Act of 1775 is open to criticism; an extension of so fundamental a patent for twenty-five years was not only unwise but impracticable, as was shown by the uncontrollable outbreak of infringements in the last ten years of the period. The extension of the Parsons steam turbine patent, also by special Act of Parliament, no doubt, had greater justification. It is generally acknowledged that Parsons obtained his Act largely as a result of the influence which the good fortune of his birth enabled him to bring to bear, and Watt had the backing of strong financial influence. But just as his birth would not have secured Parsons the extension of his patent without the merit which deserved it, so Watt would not have secured his Act without the merit which Boulton was discerning enough to recognise and support. Mr. King is, in point of fact, simply wrong in stating that mention of the Act of 1775 is suppressed in the literature on Watt. For our own part we can say without hesitation that we should be prepared to accept any revision of the estimate of Watt hitherto held, if it necessarily followed from the discovery of new facts and the re-orientation of those already known, but Mr. King does not appear to have added anything of importance to our knowledge of Watt nor to have attempted to fit in what is already known with his defamatory essay.

* * * *

World Railway Speed in 1937

BY far the most rapid general advance in speed in all railway history is that which has taken place during the past five years. In 1937 a greater aggregate mileage of start-to-stop runs, by nearly 2,000 miles, was booked on railways at speeds of 70 m.p.h. and over than was booked at 60 m.p.h. and over in 1932. In 1931 France had but one run, 95 miles in length, booked at as much as 62 m.p.h. from start-to-stop; today the aggregate French mileage so booked is 10,894 daily. As late as 1932 Germany had not a single run that attained even to the mile-a-minute level; in 1937 8,235 miles were scheduled daily at 60 m.p.h. and 2,513 miles at 70 m.p.h. and over. In two years, from 1935 to 1937, Great Britain and the United States have both doubled their mile-a-minute mileage, the former increasing from 5,371 to 11,228 miles booked at 60 m.p.h. and over, and the latter from 19,279 to 37,412 miles. By 1937 the railways of the world between them have reached a total mile-a-minute mileage of 74,741, of which no less than 31,466 miles are booked daily at speeds of over 64 m.p.h. from start-to-stop, and 8,584 miles at over 70 m.p.h. So rapid has been the advance, indeed, that the G.W.R. Cheltenham Flyer, which when accelerated in 1932 to its present 65-min. schedule from Swindon to Paddington was the fastest train in the world, now takes the 67th place, and even with steam alone is now the eighth run on the list.

These facts and many others concerning current railway speed are set out in an article on page 211 of this issue.

From this it is satisfactory to learn that during the past year Great Britain has made the most substantial advance in speed of any country, and that relatively to route mileage it can now show the best mile-a-minute figure in the world, indicating the highest general *average* of speed of all countries. As regards propulsion by steam also, with the exception of the United States, Great Britain has by far the biggest scheduled mileage of high speed runs, in all ranges of speed from 70 m.p.h. downwards—a striking evidence of the vigour with which a country depending on its natural resources of coal rather than on imported fuel has met the challenge of the later competitors by showing the extent to which steam may still be relied on for sustained high-speed service. This increase has in large measure been due to the extensive L.M.S.R. acceleration programme, and in some degree, also, to the streamlined services introduced on the L.N.E.R. Another point brought out in the article is that the 830 miles scheduled daily to be covered by the L.N.E.R. streamliners between Hatfield and Doncaster at an average speed of almost exactly 75 m.p.h. is, even though it be pass-to-pass and not start-to-stop, considerably the largest mileage achieved by any railway in the world in this high range of speed with steam as the motive power. In this connection it is significant that the final table of the article shows an increase in the proportion of the world's high-speed mileage that is achieved with steam, and a slight reduction in the diesel percentage—a further indication of the tenacity with which steam is holding its own, and even tending to regain lost ground.

As regards individual trains, Germany holds the "blue riband" both with diesel and steam propulsion, in the former with the Fliegende Kölner diesel-electric train, making in succession runs of 82·3 and 82·2 m.p.h. from start-to-stop, and in the latter with the evening "FD" non-stop from Berlin to Hamburg, booked over 178·1 miles at 74·2 m.p.h. Next after Germany comes the United States, where the diesel-driven twelve-car City of Denver of the Union Pacific has runs of 81·4 and 80·3 m.p.h. in succession, and the steam-hauled streamlined Hiawatha of the Milwaukee road, at 73·9 m.p.h., does a neck-and-neck with the famous Detroit Arrow of the Pennsylvania, booked in each direction over the 141 miles between Fort Wayne and Englewood at 73·6 m.p.h., and with non-streamlined locomotive and stock. The fastest schedule in Great Britain—the 71·9 m.p.h. of the L.N.E.R. Coronation from King's Cross to York—takes seventh place among the world's fastest runs with steam, though with the exception of the two German steam runs, it would be possible to take sections of the Coronation's journey that are booked at higher speeds than those of any of its other four superiors over corresponding distances. Electricity has not yet reached so high a range of speed as this (with the exception of the two not entirely practical 75 m.p.h. 15-mile runs of the Chicago, North Shore & Milwaukee), but it is significant that the first runs at over 70 m.p.h. (71·3 and 70·2 m.p.h., respectively) have now appeared in the Pennsylvania timetables over the densely-occupied electrified main line between Newark (New York) and Philadelphia.

It is, further, satisfactory to record—and this is a matter for thankfulness rather than for boasting—that these revolutionary increases in speed are being made effective without any increase in the frequency of accidents. An editorial note in our issue of December 3 last recorded that once again, in the first half of 1937 (the latest period for which statistics are available), the American railways repeated their record of the whole of 1935 in not losing a single passenger's life in a train accident. Rarely, if ever, is one of the fastest services, such as those that figure in these tables, involved in a major disaster. The reason doubtless is that the extension of automatic signalling and automatic train control is reducing to a minimum the risks arising out of failure of the human element; while the use of the strongest practicable form of rolling stock in its turn is reducing the disastrous effect of railway accidents when, as in the best-regulated families and sometimes from causes beyond human control, they do happen. It remains only to add that one of the most potent safeguards against accident is punctual running, and in this realm it is unfortunately the fact that Great Britain does not at present shine by comparison with the other countries figuring in these tables, the United States and France in particular. The paper promises of the timetables are no more than pious hopes unless they are translated into actual fact in daily running, and in this respect it is to be trusted that 1938 will witness as material an improvement as 1937 has seen in the schedules of the trains.

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Australian Commonwealth Railways

THE results of working of the Commonwealth Railways, as a whole, for the year ended June 30, 1937, showed a surplus of earnings over working expenses of £31,436, as compared with a surplus of only £252 in the previous financial year. This favourable result has been surpassed in only one year since the inauguration of the Commonwealth Railways, in 1927-28, when the surplus was £62,397. That record result, however, was accounted for by the conveyance of materials for railway construction. For the year under review the earnings for the whole system were higher by £54,540 than in 1935-36, all the individual lines showing an increase, and working expenses being only £23,356 higher. The Trans-Australian Railway again showed improved traffics, the earnings being £26,489, or 10 per cent. higher. Net receipts for this line, however, were less than in the preceding period owing to an increase in working expenses due to an additional train having to be provided weekly each way between Port Augusta and Kalgoorlie for a considerable portion of the year. It is noted that the expenditure does not include £65,000 provided by the Commonwealth Treasury for sleeper renewals. On the Central Australia line the loss on working was reduced from £37,438 in 1935-36, to £7,768. Not only was revenue better on this line but working expenses were reduced by £3,652. On the Northern line a small increase in earnings was accompanied by a decrease in working expenses, and a similar result is recorded for the small Federal Territory link line.

The figures for the four lines making up the Commonwealth system are summarised as follow:—

	Earnings		Working Expenses	
	1936–37	1935–36	1936–37	1935–36
	£	£	£	£
Trans-Australian Railway (Port Augusta-Kalgoorlie, 1,051 miles 68 ch., 4 ft. 8½ in. gauge) ..	273,142	246,653	231,659	201,421
Central Australia Railway (Port Augusta-Alice Springs, 771 miles 33 ch., 3 ft. 6 in. gauge) ..	126,999	100,981	134,767	138,419
North Australia Railway (Darwin-Birdum, 316 miles 40 ch., 3 ft. 6 in. gauge)	35,040	33,662	38,713	41,634
Federal Territory Railway (Queanbeyan - Canberra, 4 miles 75 ch., 4 ft. 8½ in. gauge)	7,068	6,413	5,674	5,983
Total, 2,144 miles, 56 ch...	442,249	387,709	410,813	387,457

On the Trans-Australian Railway through passenger traffic again showed an improvement of about 16 per cent. over

the previous year, the increase being 71 per cent. compared with the year 1931-32. But airways competition is now becoming evident. The question is now under consideration of stimulating passenger travel between the eastern States and Western Australia. It is hoped that the new extension from Port Augusta to Port Pirie and the fast service to be introduced early in 1938 will bring an increase in traffic. When the new locomotives have been delivered passengers will save a day on the journey between Sydney and Melbourne and Perth.

Unfortunately, the introduction of the fast service has been delayed by the failure of the contractors to deliver the new locomotives in time. These new engines, eight in number, are of the New South Wales Government Railways 4-6-0 type, with a tractive effort of 30,500 lb., axle-load 20 tons, and weight in service 205 tons, including the large 12-wheel tenders having a fuel capacity of 17½ tons and carrying 12,000 gal. of water. This high coal and water capacity is designed to meet the long hauls and peculiar conditions obtaining on the Trans-Australian Railway. These conditions have also made it desirable to provide air-conditioned cars, of which nine lounge and dining cars are now available. The new Port Augusta—Port Pirie—Red Hill extension was officially opened on July 23, 1937, by the Rt. Hon. J. A. Lyons, for the Commonwealth, and the Hon. Sir Herbert Hudd for the State of South Australia. The length of the Commonwealth section is 56¼ miles, and of the State section 27¾ miles. The line is on the 4 ft. 8½ in. gauge except the first 4¼ miles from Port Augusta, which are built on the existing railway, a third rail being provided giving both 4 ft. 8½ in. and 3 ft. 6 in. gauges. By the Port Pirie—Red Hill route overland travel has been shortened by approximately 70 miles, and the number of breaks of gauge is reduced. The heavy grades of 1 in 40 and the sharp curves of the old route have been avoided, the ruling gradient on the new line being 1 in 100, with easy curves. A shorter, faster, and much more comfortable journey is now assured to passengers. This new service was fully described in our issue of January 7.

* * * *

Swedish State Railways: Results in 1936

THE full statistics of the Swedish State Railways for 1936 show some interesting results additional to the preliminary figures given on p. 383 of our issue of September 3, for the receipts were higher than those of the previous record year, 1929, by 1·5 per cent. and exceeded those for 1935 by 9 per cent. Passenger, freight, ore, and mail traffics all showed substantial increases over the preceding year, but compared with 1929 the freight and ore traffics showed a decrease. After accounting for all interest and capital charges and pension and other commitments, the surplus for 1936 was 6·6 million kr., an increase of 113 per cent. over the figure for the preceding year. The revenue and operating expenditures for the past four years and for 1929 are given in the table below:—

Year	1936	1935	1934	1933	1929
	Million kr.				
Receipts—					
Passenger	75·9	70·9	66·0	60·0	65·9
Freight (without ore)	102·7	97·1	90·9	79·2	108·9
Ore	21·0	14·3	9·0	4·5	23·5
Posts, &c.	11·6	11·1	10·9	10·7	9·9
Total	211·2	193·4	176·8	154·4	208·2
Operating expenditure	96·0	92·7	90·7	89·6	—
Surplus after all commitments	+ 6·6	+ 3·1	— 2·4	— 15·0	—

Thanks partly to the rapidly increasing electrification of the principal lines, the passenger traffic has risen steadily since 1933. The number of passengers carried in 1936 was 5·1 per cent. more than in 1935, the passenger-km. figure 7·7 per cent. higher, and the passenger receipts 7·4 per cent. more. The actual number of persons carried was 41·9 million, and the receipts per ticket averaged 1·77 kr. and the receipts per passenger-km. 3·68 øre. Goods traffic, excluding the Lapland iron ore transport, rose only from 10·0 to 10·4 million *tonnes*, but the receipts rose from 97·1 to 102·7 million kr. and the average haul from 168 to 172 km. The through goods tonnage to and from Germany decreased by 3 per cent. to 204,000 *tonnes;* that with Denmark increased by 7·6 per cent. to 198,000 *tonnes;* and that with Norway, excluding ore traffic, increased by 3·5 per cent. to 249,000 *tonnes*. Over the Sassnitz-Trälleborg train ferry the number of passengers was 150,000, an increase of 35,000, and the goods traffic amounted to 201,000 *tonnes*. Great increase in the passenger and goods traffic with Denmark was recorded. On the Malmö-Copenhagen route the number of passengers increased by 6·5 per cent. to 265,000 and the freight tonnage by 22 per cent. to 137,000 *tonnes;* on the Hälsingborg-Elsinore route the passenger increase was 19·8 per cent. to 963,00 and the freight increase 24 per cent. to 78,000 *tonnes*. As a result of the trouble in Spain, the Lapland iron ore traffic increased considerably, the tonnage carried going up by 45 per cent., although the demand for the ore did not rise unduly until the second half of the year. Apart from the rise from this particular cause, the Lapland iron ore traffic forms a better guide to general trading conditions throughout Europe than normal passenger and freight traffics, as may be judged from the following table:—

	1936	1935	1934	1933	1929
Tonnes carried, millions	7·4	5·1	3·2	1·6	8·6
Tonne-km., millions ..	1,128	760	472	276	1,325
Receipts, millions of kr.	21·0	14·3	9·0	4·5	23·5
Receipts per *tonne*-km., øre	1·86	1·88	1·91	1·61	1·77

All the ore traffic on the Lapland line is electrically-hauled. During 1936, a further 257 route-miles of the Swedish State Railways were turned over to electric traction, making a total of 1,780 miles, or 39 per cent. of the total. Of the aggregate passenger and goods ton-miles, 75 per cent., and of the aggregate train-mileage, 58 per cent., are now handled electrically.

* * * *

Chimney: Funnel: Smokestack

SOME months ago the correspondence columns of a daily newspaper revived the old question as to which is the "correct" name for the smoke uptake of a locomotive, and in our issue of November 19 last we commented that although both the words "chimney" and "funnel" meet the case of the locomotive equally well, there is no doubt that the long-standing practice of British locomotive circles is to use the word "chimney." Our American contemporary, the *Railway Mechanical Engineer*, has now taken the matter a step further by referring to our editorial and quoting our remark that the word "chimney" has been used from the earliest days of steam traction, as we find that in February, 1804, Richard Trevithick referred to the chimney of his "tram-waggon." On the other side of the Atlantic, of course, neither chimney nor funnel is used and we are told that "the term locomotive chimney seems weak and effeminate to an American. It is never used in this country, even by non-railroaders. Smokestack seems far more appropriate when associated with our rugged and powerful locomotives, and then, too, imagine how the railroad or locomotive 'fan' would react to the term employed by our British cousins!"

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

Metropolitan Line Improvements

January 24

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Reading with interest your article entitled "Metropolitan Line Improvements" appearing on page 129 of your issue of January 21, I note the following:—

"Already there are indications that people are taking advantage of the assurance of better transport, to build homes of good class in the attractive country of the Chalfonts and the Chilterns."

All the improvements on the Aylesbury line outlined in the same article are scheduled to be completed some time in 1939 at the earliest, but, in the meantime, with more and more houses being built the existing facilities are becoming quite inadequate, and cases are even known of passengers in the third class having to stand all the way from Amersham or Chalfont to London during the busy hours, whilst first class passengers entering some of the trains at Northwood experience increasing difficulty in finding a seat, and have, indeed, complained to the L.P.T.B. about it.

It would thus seem that with increasing numbers of people coming into the districts, a fairly lengthy period during which the present inadequate facilities will operate has yet to be faced, and every day the conditions are getting worse.

Yours faithfully,

CHALFONT RESIDENT

Locomotive Stability

London, E.C.2, February 1

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I have noted with great interest the short article appearing on page 174 of your issue of January 28, entitled "Locomotive Stability," and the drawings on the folding plate accompanying it. Not being an engineer, but keenly interested in all matters concerning locomotives, I would like to inquire as to what may account for oscillatory and other irregular movements of locomotives on the rails, in addition to the effects produced by the position of the centre of gravity.

Any information that you can give would be very gratefully received by me, and no doubt by many of your other readers similarly placed to myself.

Yours faithfully,

"LOCOMOTIVE LAYMAN"

[The three chief reasons for oscillatory and other irregular movements of locomotives on rails are: (1) The impulses received from the cylinders which are regular, and positive and negative, tending to move the front of the locomotive frame from side to side; (2) the impulses received from the unbalanced weight in the wheels, which tends to move the front of the locomotive from side to side, and also the balance weight variation from positive to negative acting on the track; (3) the unevenness of the rails in the cross direction producing vertical motion. As regards the centre of gravity question and the impulses received from the cylinders, as was stated in the article in our issue last week, the steadiest engines from this point of view are those in which the outside cylinders are fairly near to the driving wheels, or in other words, when the horizontal distance between the transverse avis of the centre of gravity and the vertical line of the outside cylinders is as short as possible. An engine thus constructed is less likely to "lift," roll, or otherwise set up unbalanced action. It is difficult to deal with this matter without resorting to technicalities, but if the above, together with what appeared in the issue, are read in conjunction, and the diagrams are consulted, it should not be difficult to understand things completely. There must always be taken into account the weight distribution of the engine, the condition of the track, the speed factor, and so on, although other things being equal an engine with what may be termed favourable centre of gravity will be able to ride through all these disadvantages much better than one not so good in that respect.—ED. *R.G.*]

The Evolution of Railways

236, Ferme Park Road, N.8

January 26

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I have found most interesting your publication entitled "The Evolution of Railways" by Charles E. Lee. On page 4 he quotes a text from Isaiah beginning "Every valley shall be exalted . . ." This text was carved in Latin inside the Papal Saloon of the Pope's private train on the old railway from Rome to Frascati in the days of the pre-1870 States of the Church.

A good English example of a "Roman rutway" (such as is mentioned on page 6 of the book) is to be found in the classic instance of the road over Blackstone Edge between roughly Rochdale and roughly Halifax—although it does not go all the way. There is not only the wheel-track but also a rut for a brake-skid on the down trip. I saw this track quite recently—it is perhaps a quarter of a mile from the modern road—and even made a cursory reference to it in "My Own Queer Country" which you so kindly reviewed recently.

Yours faithfully,

JOHN GIBBONS

The First Railway in China

197, Dawlish Drive,

Goodmayes, January 26

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—The editorial reference in your issue of December 24 to the first railway in China suggests that opposition to this means of transport in the celestial mind resulted in the destruction of the track between Shanghai and Woosung by an unruly mob, whereas it would appear that violation of the law was rather the action of the Europeans than the Chinese, and that the eventual dismantling of the line was arranged by the Chinese authorities with dignity and precision. May I call your attention to the well-documented story of the whole incident, which was included in the volume "The Chinese Railways: A Historical Survey," by Cheng Lin, formerly Counsellor in the Chinese Ministry of Railways, which was published as recently as August, 1935.

He points out that as early as 1865 the mercantile house of Jardine, Matheson & Co. Ltd. formed the Woosung Road Company to build a railway between Shanghai and Woosung, with Henry Robinson as Chief Engineer. For a time the scheme was dropped owing to official Chinese opposition, but it was revived secretly in 1872. The promoters then secured permission to build a carriage road, and thus obtained possession of the necessary land, and the intention to lay rails along the road was first made public in a newspaper called *Shun Pao* on May 6, 1873. Despite Chinese official protests, work was begun in December, 1874, and by February 14, 1876, about one-third of a mile of 2 ft. 6 in.-gauge track was completed, when the small locomotive, *Pioneer*, built by Ransomes & Rapier of Ipswich, made a trial run. Notwithstanding strenuous official objection, the railway was opened as far as Kiangwan on June 30, 1876, with six passenger journeys daily.

The legality of the position was still being disputed when, on August 3, 1876, a Chinaman was run over and killed, and furnished grounds for drastic measures against the railway and its owners. Finally, an agreement was reached between

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the Chinese Government and the British Consul, and a translation of the text of the document (which was dated October 24, 1876) is given in Dr. Cheng Lin's book. The arrangement thus made was that the Chinese Government should buy the entire property of the Shanghai-Woosung Railway for an agreed sum payable within one year in three equal instalments. It was agreed, moreover, that no further railway construction should be undertaken by British interests without the approval of the Chinese Government. The railway was permitted to continue working on its completed section of about ten miles until the final instalment of the purchase money was paid. On that date—October 20, 1877—the transfer was completed, the service immediately withdrawn, and the rails promptly taken up and shipped to Formosa. The present Shanghai-Woosung Railway, a branch of the Nanking-Shanghai Railway, was built in May, 1897, nearly twenty years after the destruction of its predecessor.

Yours faithfully,

W. NOEL JACKSON

The Case for Final Amalgamation

99, Clifton Road, S.E.25

January 24

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—There is a popular supposition, familiar in cartoons, which has it that a man's personality comes ultimately to be a reflection of his environment or pursuits. Thus dog-lovers are depicted evolving in likeness towards their pets; the chemist is accused of resembling a bottle, and so on. If—as certain recent publications make it pertinent to enquire—there be any pervasive influences likewise to be detected in the railway world, probably they are best summed up in the words of Lomonossoff at the beginning of his "Introduction to Railway Mechanics." "Aircraft," he points out, "has three degrees of freedom; boats and automobiles, two; and trains only one"; to which it might be added that the railways also suffer severe restrictions in the fourth dimension of finance. It can hardly be denied that the rates of progress in these respective spheres have been in much the same proportion as the number of degrees of freedom possessed by each; and this notwithstanding that transport by air is said to take twenty times as much power, and by road ten times as much power, weight for weight, as by rail. It seems not unreasonable, therefore, to conclude that this limitation to one degree of freedom, and the consequent rigidity of railway schedules, have come to exercise over the personnel an inhibiting influence that enhances the intractability of the conditions themselves.

For illustration of this tendency, we need look no further than the failure of the railways to bring about final amalgamation of their own accord. It may have taken the great war to effect the grouping of 1921; but surely it ought not to require a further cataclysm for the process to be carried to its logical conclusion. No ill effects have been attributed to the measure of consolidation hitherto achieved, and many economies have been rendered possible by it—probably some two-thirds or more of the huge saving of £40,000,000 a year which, according to Mr. W. J. Stevens's recently published book, the railways were able to effect between 1924 and 1933. Nor has there been any reason to fear opposition to final amalgamation from railway users, to whom the Railways Act of 1921 has likewise proved beneficial. When this Act was passed, it is true, it was thought desirable to retain a considerable element of competition in the interests of the public. What the actual effect has been will be obvious to anyone familiar with the procedure of the Railway Clearing House and the way in which possession of a lightly-worked secondary line, extending into the territory of another group, can be (and is) used to obstruct a progressive policy in that area.

Meanwhile, the ceaseless advance of efficiency in transport by road makes it more than ever imperative that the railways should mobilise their huge resources to the full. Yet progress remains impeded largely by over-capitalisation and by the congested state of a medium whereon alterations to a single train may have reverberations throughout the system—the underlying factor to which many of the anomalies of goods train working and charges are undoubtedly due. In both these directions, the advantages of final amalgamation would be very great. In the sphere of railhead delivery, for example, there are substantial economies to be effected, both in capital and in running costs, by the use of a common service of motor lorries in the many cases of collateral lines lying only a few miles apart. Extended railhead delivery, affording more convenient selection of transhipment point, has already proved an unqualified success. Clearly, its value would be much increased if it afforded choice also of route with consequent lightening of the restriction to one degree of freedom.

The elimination of redundant train services could indeed be carried a very great deal further than is possible under a grouping designed, not to terminate competition, but to keep it alive. Moreover, a considerable degree of specialisation would be rendered possible—manifestly a matter of rapidly-growing importance under conditions in which normal traffic is becoming liable to serious delay in order to keep the road clear for a few spectacular expresses. Under a final unification, collateral routes could be reserved for fast and slow trains during alternating periods of the day, so that, by one route or the other, time paths would always be easy to find for any particular class of traffic, and especially for the provision of intensified passenger services such as those which run every twenty or thirty minutes from New York to Philadelphia, and hourly even to Washington, 226 miles away. Thus, also, would mass acceleration of the kind practised between New York and Washington with almost every fresh issue of the timetable be rendered far easier than at present; and the railways' one degree of freedom be afforded a measure of reality such as it hardly possesses so long as the speed of express trains is conditioned largely by that of freight. Appropriate use of branch lines would obviate detriment to intermediate towns during the periods when the routes on which they stood were "running slow"—witness the saving of virtually two hours by use of the circuitous L.N.E.R. from Carlisle to London in the morning. By such means, the simultaneous timing of parallel services could be reduced to a minimum. Again, should the results of the Sheffield-Manchester scheme be such as to promote electrification elsewhere, final amalgamation would make it possible to pave the way by means of suitable preliminary re-organisation, enabling the actual conversion to be embarked on without fear of renewing the disastrous competitive planning of the past. And, where unified control from the beginning would probably have led to a fundamental trunk system for the great cities, supplemented by lines of lighter construction to penetrate and develop less populous areas, we might hope even yet to see the emergence of such an economic ideal, translated into terms of electrified and non-electrified routes.

Indeed, when the Chairman of the L.N.E.R. fully confirms that a host of economies are still to be attained, it may well be asked why it should be left for State purchase to bring these about—especially as their accomplishment now would greatly strengthen the hands of stockholders should State purchase actually come to pass. From the enthusiasm with which the blessings of the 1921 Act were extolled in the advertisements of the railways themselves, one would have imagined that, after imbibing such acceptable wine, straightway they would have desired more without awaiting further intervention by the State; and it may be questioned whether their curious temperance in this respect is altogether to be commended. What could be worse than for a system of arbitrary control, commonly lauded as the means *par excellence* for getting things done, to be used as a no less puissant instrument of obstruction, with its exponents figuring as the veritable Ziim and Iim and Ochim of industrial administration? Why, too, should the apostles of nationalisation be afforded an unduly propitious field for their experiments, however interesting and valuable these might be? That the railways should make the utmost of all the assets at their command is, from every conceivable point of view, surely a matter of supreme importance, made all the more urgent by any prospect of ultimate purchase by the State.

Yours faithfully,

K. H. JOHNSTON

PUBLICATIONS RECEIVED

Manual of Electrical Undertakings and Directory of Officials (Garcke), 1937-38 Edition. London: Electrical Press Limited, 13-16, Fisher Street, Southampton Row, W.C.1. 8½ in. × 5½ in. × 2¾ in. 2,024 + cxvii pp. Price 37s. 6d. net.—This well-known work of reference has been subjected to the usual careful scrutiny for information which, with the passage of another year, became in need of revision. Particulars are given once again of British and Colonial electricity supply undertakings, and also of electrical contractors in the leading towns of the United Kingdom. Among the other valuable sections is one listing the names and addresses of firms engaged in the manufacture of electrical appliances, and another listing the names and addresses of electrical engineers and officials, including those of all who belong to the Institution of Electrical Engineers. The volume is prefaced by some statistics and notes relative to the various developments that have taken place during the past twelve months.

The Manewood Line : A Romance. By James Kenward. London: Stanley Paul & Co. Ltd., Paternoster House, E.C.4. 7¾ in. × 5¼ in. × 1½ in. 350 pp. Price 7s. 6d. net.—Modestly described as "A Romance," this book contains, in fact, three major and several minor romantic happenings. There is, first, the history of "the Manewood," the flat but picturesque peninsula of West Sussex which possesses a character quite its own; then the story of the light railway which traversed the land from end to end; and finally an inevitable, and mostly irrelevant chronicle of human affection, with numerous satellite courtships. We are not certain as to which of these justifies the sub-title of the book. The disguise thrown over the Manewood peninsula is pleasingly thin; to the reader who has but a slight acquaintance with the locality it is no more than a tinted glass above a delightful picture. The author goes so far as to furnish semi-pictorial maps, accurate in every detail as to roads and railways, and it is only the altered place-names which remind the reader of the fact that the story is intended to be read as a novel. But in the description of the light railway—the Manewood Line—facts again predominate. We seem to be familiar with "that nine-mile strip of land, rather overgrown, rather neglected, in some places more like a sheep-drive or a bridle-road than a railway . . ." and the locomotives, "the stolid old *Argosy* and *Cumberland* with which the railway began, the little *Rocking Bell* from Rockingham colliery," and so on. But we must not disclose too many of the brilliant side-lights of light railway operation which the author has introduced so skilfully. It will be sufficient to state that, despite a somewhat fanciful conclusion, the book will be enjoyed, not only by those who take an interest in railways, but by readers who prefer stories based upon a certain amount of fact as distinct from pure fiction.

Southampton Docks, 1938. London: The Southern Railway Company. 9¾ in. × 7½ in. 132 pp. + xxix. With illustrations and maps. Price 6d.—Besides giving all information regarding rates and charges required by the trader, this handbook provides a remarkably low-priced guide to the activities of Southampton Docks for the ordinary visitor. Here he will find means of identifying from their funnel markings the numerous steamship lines calling at the port; the places to which they ply, how far they are from Southampton, and their local times compared with Greenwich; views and a plan of the docks; and a map of railway connections with the principal industrial centres in Great Britain. Southern Railway transport services, such as express goods trains, road lorries and trailers for urgent cross-country deliveries, and container facilities are represented in the text and illustrations. Even the passenger going no farther afield than the Continent may embark at Southampton, whence the railway company's own steamers sail to Havre, the Channel Islands, and St. Malo; or he may enjoy a bird's-eye view of the docks from an armchair seat in a Railway Air Services machine ascending from the airport. Whatever the type of journey that brings him to Southampton he will find much to inform and interest him in this handbook.

Enginemen's Mutual Improvement Class Papers. 1937. London: *London Midland & Scottish Railway Magazine*, Euston, N.W.1. 9½ in. × 7½ in. 16 pp. Illustrated. Price 4d., post free.—In his foreword to this admirable further series of E.M.I. Class Papers, reproduced from the 1937 issues of the *L.M.S.R. Magazine*, Mr. D. C. Urie, Superintendent of Motive Power, L.M.S.R., aptly remarks: "It is scarcely necessary for me to point out that the man most qualified to handle and repair a locomotive is the one who best understands it, and it is my earnest hope that this new series of articles may still further stimulate the Mutual Improvement Class movement, through the medium of which the staff can obtain sound and regular advice in any difficulties which they are likely to encounter." Fresh developments in locomotive engineering nowadays occur frequently, and their description in so easily assimilated a form as is presented here, together with the excellent explanatory sketches used, make these papers an ideal means of easily keeping up to date for both locomotive enginemen and students alike. The new series describes and illustrates the following locomotive and rolling stock components, with particular reference to L.M.S.R. practice: driver's brake controls on new standard engines, Venturi and old type carriage warming reducing valves, horizontal dome-type regulator, valves and pistons on new standard locomotives, marine and bush-type big ends, and tender water pick-up gear. There are also notes on big-end bearings and on testing valves and pistons, a double-page table giving the leading dimensions of L.M.S.R. standard locomotives, and a single page table of L.M.S.R. motive power depots with their classification numbers and letters.

Battery Lamps.—We have received from Alklum Storage Batteries Limited, Waterside Works, Halifax, an illustrated catalogue of portable lamps and lighting sets fed by Alklum steel batteries. The equipment ranges from hand inspection lamps up to a set with universally-jointed light source capable of throwing a 150-yd. beam, and to a large floodlighting set in which a 12-volt battery supplies three floodlamps pivotably mounted on a tripod with telescopic legs. Characteristics of the Alklum steel batteries are freedom from sulphation or cracking of containers, the latter being of steel and welded at top and bottom.

Feeder and Distribution Pillars.—A feeder and distribution pillar designed to occupy the smallest possible space—and hence appropriately called the Dwarf-type pillar—is the subject of a pamphlet which we have received from British Insulated Cables Limited, Prescot, Lancs. The pillars are made for currents of 150 and 300 amp., in four- and six-way patterns. They may be built into walls or mounted against them. Cable and busbar fittings are of extruded copper, mounted on robust insulating bars, and accommodate either links or high rupturing-capacity fuses. The coloured pegs used as phase indicators are so arranged that it is impossible for a fuse to be connected inadvertently across two phases.

Light Metals. London: Temple Press Limited, 5-17, Rosebery Avenue, E.C.1. 12¾ in. × 9¾ in. Price 1s. monthly.—A glance through the first issue of this new monthly publication from the Temple Press Limited reveals the growing range of subjects with which in justice to its title it has to deal. Engineering applications of light metals form the subject of several authoritative illustrated articles, in which the value of aluminium and other lightweight alloys is reviewed with particular reference to the improvements they effect in the design of internal-combustion engines, and components or bodywork for motor vehicles and aircraft. The decorative possibilities of patterned aluminium sheet; of aluminium treated by the anodising process; and of light metal furniture for the office or home, are also adequately represented in the text and illustrations. As the railways are concerned with light metals from the mechanical, architectural, and decorative standpoints, this new publication (the first number of which, dated February, is now on sale) will prove of value by presenting current developments under all three headings between two covers.

XUM

THE SCRAP HEAP

A locomotive has been sent by the King of the Belgians to Tangiers as a present to the Sultan of Morocco, a singularly inappropriate gift considering that there is not a yard of railway or tram line within his dominions.—*From "The Universe" of Saturday, January* 28, 1888.

* * *

ONE OVER THE EIGHT?

We were led to believe that the running by the London Passenger Transport Board of *nine*-coach trains on the Northern Line was a well-meaning step taken to prevent trains at certain hours from becoming full. It is regrettable, therefore, that evidence (not our own, but that of a highly trustworthy witness) goes to show that trains on that same section are showing a propensity towards becoming still fuller.

* * *

HOW C.N.R. COACHES ARE NAMED

Naming passenger vehicles is a practice of the Canadian National Railways. Sleeping cars are named after stations, and chambrette, or sleeping room, cars have the names of Canadian seaports. Parlour and parlour buffet cars are named after Canadian lakes, while Canadian rivers lend their names to café parlour coaches. Compartment observation sleeping cars bear names of capes, while observation, library and buffet cars are named after forts famous in history. Dining cars, tourist cars and lunch counter cars are designated by number only—and the same system is followed for the new luxurious air-conditioned coaches in daily international service between Chicago, and Detroit; and Toronto, and Montreal.

* * *

A LITTLE HORSEPLAY

A few people at Graz railway station in Austria saw a fight between fifteen foals in a railway loose box. While a goods train on its way to Vienna was halted in Graz station, a noise of tramping, kicking, and neighing was heard coming from a horsebox, in which railway workmen, hastening up, saw a confused mass of horses' necks and legs. A fight was in full progress, and all efforts to check the battle were of no avail. When some measure of peace and order had been restored, three animals were unfortunately lying dead, and three more were so seriously injured that they had to be destroyed immediately. The remaining uninjured horses were with difficulty removed by the fire brigade to a second horsebox, as that in which the fight had taken place had been almost demolished.

* * *

A 15 PER CENT. RAILWAY DIVIDEND

The Portland Railway Company, which is concerned exclusively with the carriage of stone, has declared a dividend of 15 per cent. in respect of the past year. The company was incorporated on June 10, 1825, and its line opened in October, 1826. In its centenary year (1926) the company paid a dividend of 33½ per cent. Its long independent history was recorded in an article on the railways of Portland by Mr. Charles E. Lee, which was published in our associated monthly publication, *The Railway Magazine*, for November, 1937.

* * *

A railway traveller was fined for smashing a bottle of whisky on the head of a porter. Perhaps that will teach him to take a corkscrew with him in future!

* * *

THE CATTLE TRAIN

The other day I watched with envious eye
A train of cattle slowly gliding by ;
With head to stern athwart each spacious truck
They comfortably stood : ye gods, what luck
Some creatures have on this unequal earth !
But for the accidents of breed and birth
Me, too, such placid transport might avail,
With no discomfort greater to bewail
Than casual tickles from a tufted tail.
Ah, what relief were mine ! To overcrowd
These trucks by Board of Trade is not allowed,
So no plethoric bullock could impose
His stall-fed magnitude upon my toes,
Nor should I feel, aflame on neck and ear,
The vinous breath of some convivial steer ;
Nor could the fastest heifer here disgrace
The leisurely decorum of our pace
By publicly embellishing her face.

[A. QUITZOW]

One Hundred Years Ago

Extracts from the February, 1838, issue of "The Railway Magazine" (afterwards "Herapath's Railway Journal") and the oldest constituent of THE RAILWAY GAZETTE

Grand Junction Railway.—The Directors, from the 1st of February, intend to commence carrying goods, timber excepted. The conveyance on the line has hitherto been confined to passengers and small parcels.

Birmingham Railway.—An elegant silver tureen of 130 guineas value, was lately presented to Mr. Robert Stephenson, chief engineer, by the assistant engineers and others under him, as a testimonial of their esteem and respect for him.

Glasgow, Paisley, Kilmarnock, and Ayre [sic] Railway.—The Directors of this Company have undertaken to make the portion of their line between Glasgow and Paisley jointly (expense £140,000) with the Glasgow, Paisley and Greenock Company, and to divide the profits of this part equally. Other amicable terms have been settled highly creditable to the feelings and conduct of both parties, which must be beneficially felt by their proprietaries. An agreement has also been entered into with the Kilmarnock and Troon Company, to improve and render their line fit for locomotives, which will open communications with several other important places. The nett revenue is estimated at £75,885 after deducting one-third for expenses, which is about 12 per cent. on the cost, £625,000, exclusive of engines, carriages, &c. The receipts have been £21,166 3s. 5d., and the balance in hand is £1,627 8s. 11d.

Birmingham and Gloucester Railway.—Considerable activity prevails in the direction of this railway. The contracts are extending over a great portion of the line from Cheltenham to Birmingham. But that which the shareholders will not fail to like is, that in every instance we hear the contracts are below the Parliamentary estimates. We cordially hope the actual and Parliamentary estimates of revenue will be in the inverse order.

Railroad in Cuba.—The length of the railway from Havannah to the terminus at Guines, is 46 miles, of which 16½ miles are now open. The road passes through the most populous and important parts of the country for passengers and the traffic with Havannah; and we are informed the remainder of the line will soon be opened, a great part of the permanent rails being now laid down. The population of the Havannah and the neighbourhood, exceeds 260,000; and the several intermediate stations and Guines, 90,000. The royal Junta of the Island of Cuba have constructed this road from funds raised in London by bonds, for the security of which the revenues of this body (which are unconnected with the Government, and applicable to internal improvements of the island), together with the income of the road, are pledged.

Railroads in Prussia.—The King of Prussia, in his permission to construct railroads in that country, stipulates, that Government shall at any time be at liberty to take possession of the whole concern, paying a compensation to the existing shareholders; and further, that at the conclusion of ninety years, the railroads shall become, unconditionally, the property of the State.—*Rochester Gazette*. (We doubt this, for the King of Prussia is one of the most enlightened and liberal monarchs of the age.—Ed.).

Newcastle and Carlisle Railway.—The whole of this Railway between Greenhead and Haydon Bridge, and the tunnel near Ridley Hall, are progressing rapidly.—*Carlisle Patriot*.

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

ARGENTINA

Summer Train Services

[The following are some more of the accelerated or reduced-fare services introduced or improved this summer, in continuation of those mentioned last week—Ed. *R.G.*]

Central Argentine Railway

This railway introduced during December a new series of daylight excursions between Buenos Aires, Rosario, Santa Fé, and Cordoba, an entirely new departure in cheap railway facilities in Argentina, providing one-class travel at attractively low return fares, inclusive of *table d'hôte* meals *en route*—light breakfast or afternoon tea and lunch or dinner, according to circumstances—the tickets allow of a stay of from 5 to 7 days at destination. The service is a weekly one, the itineraries being as follow:—

Buenos Aires to Cordoba, every Sunday, returning on the following Monday week. Capacity: 500 passengers.

Buenos Aires to Rosario, and Santa Fé, every Wednesday, returning on the following Thursday week. Capacity: 170 and 44 passengers, respectively.

Rosario and Santa Fé to Cordoba, every Wednesday, returning on the following Thursday week. Capacity: 200 and 44 passengers, respectively.

Cordoba to Buenos Aires, Rosario, and Santa Fé, every Thursday, returning on the following Wednesday week. Capacity: 140, 80, and 44 passengers, respectively.

Santa Fé and Rosario to Buenos Aires, every Thursday, returning on the following Wednesday week. Capacity: 44 and 130 passengers, respectively.

The rolling stock consists of a set of semi-steel first class coaches of the 96-seat type, and the exteriors are painted an attractive red, imparting to them a bright and uniform appearance. These coaches, together with two dining cars, a kitchen car, and a brake van are operated as a flexible unit. The trains have been named El Popular, and the sale of tickets is limited to the capacities stated above, every passenger being guaranteed a seat, for which purpose the coaches are specially numbered. The return fares are as follow:—

	Adults	Children
(1) Between Buenos Aires and Cordoba ...	$30·00	$17·00
(2) Between Buenos Aires and Rosario ...	12·00	6·00
(1) Between Buenos Aires and Santa Fé ...	22·00	13·00
(1) Between Rosario and Cordoba	20·00	12·00
(1) Between Santa Fé and Cordoba	24·00	15·00

(1) With meals. (2) Without meals.

For the convenience of the passenger by any of these trains, a special type of ticket has been devised, comprising travel and meal coupons, with information regarding the number of his coach and turn in the dining car; details of the timetable observed by the train, prices of drinks served, &c.; the booklet is retainable by the passenger after the coupons have been detached.

B.A.G.S.R.

The express service operated by this railway between Buenos Aires and San Carlos de Bariloche (Lake Nahuel Huapi), in combination with the State Railways, has been considerably improved. The new service came into force on December 13 with the running of El Tronador (The Thunderer), which leaves Plaza Constitución terminus on Mondays and Fridays at 7.35 p.m. and Temperley at 7.58 p.m. A stop to pick up passengers is made at Bahia Blanca, the train leaving there at 6.50 next morning, and arriving at Patagones at mid-day and at Bariloche at 10.05 a.m. on Wednesdays and Sundays. As from December 22, a third express observing the same timetable now leaves Plaza Constitución on Wednesdays, to be followed by a fourth on Saturdays as from January 8, making four express services weekly. There is also an ordinary train every Sunday leaving Plaza Constitución at 8.25 p.m. and Temperley at 8.49 p.m., arriving at Bariloche at 5.15 p.m. on Tuesday. This train also serves the intermediate stations.

The return service has also been improved. El Tronador leaves Bariloche on Wednesdays and Sundays at 9.15 p.m., arriving at Bahia Blanca at 11.15 p.m. the following night, at Temperley at 10.40 a.m. and Plaza Constitución at 11.00 a.m. on Tuesdays and Fridays. From December 24 a third express will run from Bariloche every Friday, and from January 10 a fourth every Monday, making four return expresses during the summer season, which will run until further notice, all observing the same schedule. The ordinary return train leaves Bariloche at 2 p.m. every Thursday, arriving at Temperley at 9.25 a.m. and Plaza Constitución at 9.45 a.m. on Saturdays. As on the outgoing journey, this train also serves the intermediate stations.

The expresses are composed of recently renovated compartment sleeping cars, equipped with bathrooms, and dining cars, which make the direct journey between Buenos Aires and Bariloche. The first class return fare between Plaza Constitución and Bariloche is $135.85 paper, the tickets being available for return up to 120 days. Second class return, $86.00 paper (90 days' availability). Bed tickets, $20.00 each way. Passengers have the option of returning from Zapala, or *vice-versa* travelling to Zapala and returning from Bariloche. There are also special facilities for the rapid and economical transport of passengers' motorcars to Bariloche or Zapala, and back from either point. The company's summer services to Mar del Plata, Miramar, Necochea and Tandil have also been augmented and accelerated.

Harvest Prospects: First Estimate

The first official forecast of the 1937-38 harvest, issued by the Ministry of Agriculture on December 15, estimates the production of the four principal crops as follows:—

	Tons
Wheat	5,225,000
Linseed	1,585,000
Oats	710,000
Barley	540,000

Compared with the previous year, the above figures indicate the following reduction in each crop: wheat, 23 per cent.; linseed, 18·1 per cent.; oats, 10·3 per cent.; and barley, 16·9 per cent. The report states that the present agricultural year has been characterised by unstable weather conditions, and the probable yield has been appreciably affected by a number of factors, such as locust depredations, a prolonged drought and late frosts, although the effects of the last-mentioned were subsequently mitigated by beneficial rains, which considerably improved the outlook for both wheat and linseed in certain zones.

Transport of Abnormal Loads

The Central Argentine Railway was recently called upon to transport some heavy machinery from Rosario to San Lorenzo, where a Government oil refinery was being erected. It included the following abnormal units, the dimensions of which necessitated special arrangements for transportation:—

One light oil fractionator.—80 ft. 0 in. long × 10 ft. 7½ in. dia., with 8½ in. projections, weight 53·6 tons.

One high crude oil fractionator.—66 ft. 0 in. long × 9 ft. 7 in. dia., with 6½-in. projections, weight 44·9 tons.

Four high clay chambers.—Each 28 ft. 4 in. long × 12 ft. 1 in. dia., with 7½-in. projections, weight 22·4 tons.

As the dimensions of these three types of cylinder prohibited their loading on standard wagons without considerably exceeding running dimensions, two special bogies were constructed to bring them within this limitation. These bogies were equipped with a built-up steel cradle, curved to the radius of the largest diameter cylinder, and arranged so that steel packings could be readily fitted to suit the curvature of the smaller ones. The cradle of one bogie only was provided with an end frame to carry the buffing and drawgear, the other bogie being merely a trailer. Each cylinder was in turn lowered by crane on to the cradles and securely attached to them by stout chains. The frame taking the buffing and drawgear was held in position by two suspension rods clipped over the end flange of the cylinder, and secured by a stretcher plate. [The illustrations on page 221 show one of the cylinders loaded on these bogies.—Ed. *R.G.*]

Special precautions were taken to

ensure safety during the actual haulage, and the destination was reached without a hitch of any kind. The first cylinder was unloaded from the bogies by means of locomotive jacks, but, as this was a slow and tedious operation, the remainder were unloaded by the railway breakdown crane.

SOUTH AFRICA

Results of Working

The results of working the South African Railways & Harbours for the seven months April to October, show a revenue surplus of £909,098 over expenditure, after allowing for special appropriations of £583,333 to Betterment Funds, £284,083 to deficiency in Pension and Superannuation Funds, £583,333 to Rates Equalisation Fund, £145,833 to reduction of branch line capital, £1,079,167 to Renewals Fund, £442,888 to responsibility allowance, £291,667 to writing out of capital discount and expenses on pre-Union capital, and £137,428 to writing out of capital account residual value of sleeper plantations. Revenue from transportation services only for the period totalled £19,650,080, an increase of £1,125,794 on the previous year. Working expenses increased from £11,794,039 to £12,945,483.

Report of Controller and Auditor General

The audited figures for the year ended March 31, 1937, show that the operating expenses increased by £936,244 or 4·76 per cent. as compared with the previous year, and the revenue increased by £1,842,937 or 6·13 per cent. The operating ratio was 64·57 per cent., compared with 65·42 per cent. the previous year. The profit on road motor services was £45,370 compared with £66,866 in 1935-36. Of the 100 area services, 69 showed a profit of £67,548, the remaining 31 services showing a loss of £21,688. There was a loss of £490 on surplus vehicles account. On grain elevator working there was a loss of £115,400 compared with a profit of £7,460 in 1935-36. The net profit on publicity, bookstalls, advertising and automatic machines was £22,218, an increase of £1,167. The profit on bedding services increased from £12,334 to £16,456.

Rent Rebate Scheme

The rent rebate scheme referred to in clause (3) of the agreement between the administration and the staff associations [referred to in these columns in our issue of December 24 last—Ed. *R.G.*] has now been worked out in detail. The rebates will apply where the servant himself, or his family, is resident in the dwelling, and will be based upon the difference between the rental paid and one-fifth of the substantive emoluments, subject to a maximum of £4 per month. In the case of a servant who is owner of fully-paid-off property, the property will be valued and the rental assessed by the administration. In the event of a servant having persons resident with him who are not dependent on him, or who is letting rooms, or whose wife is carrying on any trade or profession whereby occupation is given to any other party, such as a boarding house, his rent will be reduced by such amount as is received in respect of rent for such room or rooms. The administration retains the right in individual cases to decline to pay the rebate and require the servant to live in suitable departmental quarters or other dwellings which it has hired in a desirable locality, and the administration reserves the right to take over the lease or hire of the dwelling of any applicant and to deal direct with the landlord. The existing District Sick Fund Boards will be constituted into System Housing Boards, and these boards will function for the purpose of considering the payment of rent rebates to the staff. Initial applications must be supported by rent receipts for the six months immediately preceding the date of application, or by affidavits both by the applicant and the landlord. Subsequent applications will be made to the immediate superior officer monthly, and if there be no variation in the rent paid, and the conditions governing the rebate are identical with the previous month, the necessary rebate will be made through the pay sheet. The operative date of the scheme will be November 15, 1937, and approved rebates will, where circumstances so justify, be applied retrospective to that date.

UNITED STATES

Precipitate Traffic Decline

The affairs of the American railways are rapidly nearing a crisis, as a result of the unprecedented celerity of the decline in traffic. Two more large railways, the Minneapolis, St. Paul & Sault Ste. Marie, a subsidiary of the Canadian Pacific, and the Erie have become bankrupt. The Baltimore & Ohio avoided this fate by a loan from the Reconstruction Finance Corporation of £1,646,000, enabling it to meet interest and other obligations. The Chairman of the Reconstruction Finance Corporation (Mr. Jesse Jones) has stated that this Government corporation may have to lend £20,000,000 to railways in the first half of the year. Such loans are made only when acceptable collateral security can be supplied, and this is not possible for all the railways, many of which have borrowed up to the hilt already.

The proposed increase of 15 per cent. in freight rates (and possibly an increase in passenger fares also, on the Eastern railways) is still being weighed by the Interstate Commerce Commission, but no decision is likely for a week or so, at the earliest.

The decline in freight traffic (as gauged by carloadings) varied between 15 and 18 per cent. below the figures for 1936 during the first three weeks of December, and then fell sharply to 25 per cent. under 1936 in the last week of the year. Passenger traffic and revenues are still holding up well above last year's levels, but passenger traffic accounts form but little more than 10 per cent. of total railway revenues.

1937 Traffic 5 per cent. Higher than 1936

Preliminary estimates of traffic and revenues for the year just past (in the early part of which traffic was, of course, increasing) indicate that 38 million freight cars were loaded, an increase of 5·6 per cent. over 1936. Passenger traffic as expressed in passenger-miles rose by 10·8 per cent. over the preceding year. Net income, however (after payment of interest on bonds), totalled only £17,000,000, as compared with £33,000,000 in 1936, because of the great increase in the cost of materials, in wages and in taxes for pensions and unemployment insurance.

Automatic Stokers Required by Order of I.C.C.

All coal-burning locomotives used in fast or heavy passenger service and having an adhesive weight of 80 tons or more on the coupled wheels, and locomotives used in fast or heavy freight service with 85 tons or more available for adhesion, must be provided with mechanical stokers within the next 5½ years, according to an order handed down by the Interstate Commerce Commission at the behest of the engine drivers' and firemen's trades unions. All new locomotives built after July 1 next must incorporate these devices.

Lorry Drivers' Hours Limited

While the railways have been harried by the trades unions, their competitors on the roads have fared no better. A few years ago drivers of neither passenger nor freight vehicles on the roads were unionised; also they were paid very low wages and worked long hours, conditions which helped the road materially in competing with the railways. Now the situation is changed, most of the road drivers are unionised, and their hours have been shortened and their wages raised.

The Interstate Commerce Commission, acting under its regulatory powers over interstate road transport, has now promulgated rules limiting the hours of labour of drivers of road vehicles. The maxima set are 60 hr. on duty weekly, or 15 hr. in any one day. The term "on duty" includes not only time spent on the vehicle, but that taken up by stops for refreshments and other purposes. These limitations are not severe, and are much less than those demanded by the unions, but the commission explains that they are a beginning only, and will be made more severe later on if such action is found necessary.

FRANCE

Increase in Metro Traffic

During the third quarter of 1937, there was a large increase in the number of passengers on the Paris Metro lines. The number rose from 168,293,955 in the third quarter of 1936 to 190,898,336 in 1937, an increase of 22,604,381. The rise in receipts was fr. 53,838,560.

Rail and Road Co-ordination

The Supreme Board of Transport held its inaugural meeting on January 14 with Senator Yves Le Trocquer, former Cabinet Minister, presiding. A statement communicated by the Minister of Public Works pointed out that rail and road co-ordination was the most urgent question and that it should be completed in 1938. The Minister added that the plans were making progress and that the road hauliers were now more inclined to fall into line with the proposals. The departmental councils were also drafting their plans which would be submitted to the co-ordination committee. In regard to goods transport the Supreme Board must impose discipline on the roads, and aid the hauliers to form responsible organisations, which is an essential condition to the distribution of traffic between the railways and the roads. At the same time the interests of the small rural carriers must be respected.

It is stated that 10 departments in various parts of France have submitted co-ordination plans to the Minister of Public Works, and that 20 other departments have their plans almost ready. Co-ordination schemes are making good progress in the rest of France. Already 826 miles of lines may be considered as closed to passenger traffic. Ultimately more than 3,500 miles are likely to be abandoned. In the Haut-Rhin department of Alsace, the plans provide for the closing of 126 miles, or nearly half of the total of 264 miles in the department.

SPAIN

Collectivisation in Catalonia

According to the Barcelona press, the decision of the Montpellier (France) Court, in the case of the Catalonia potash mines, was favourable to the Catalan Government, and the embargo obtained by the owners of the mines on the shipments arriving in France has been raised. By the finding of the French court the constitutional validity of the action of the Catalan Government is recognised, and the mines will henceforward be worked and the mineral disposed of under the collectivist regime. This may be interesting in view of any similar action that may be pending in Great Britain in connection with railways or industries other than mines, as no doubt the Catalan Government will attempt to use the finding of the Montpellier court as a test case.

In connection with the Decree of August 6, 1937, creating the Commission for Foreign Claims, it is now laid down by the Government of the Republic, that such claims must be presented through diplomatic channels.

War Damage to Railways

An Order of the Nationalist Technical Junta of State, published in the *Official Bulletin* at Burgos on December 16, provides for the payment by the State for works executed on the railways for purely military purposes. It also refers to damage caused to the railways and their equipment by acts of war. In this case the repairs are to be effected by the companies and charged to a special account, pending the decision of the Government at a later date as to the compensation, if any, to be paid. This Order of the Burgos Government is indirectly interesting, as it refers to those railways adhering to the Statute of July 12, 1924, which clearly indicates that in Nationalist territory the railways are still assumed to be working under the old laws and regulations, and the Railway Statute of Primo de Rivera's Directorate is still in force.

DENMARK

New Bridges in Jutland

It is hoped to have the new bridges across the Limfjord at Oddesund and Aalborg ready in time for the introduction of the summer timetables on May 15 next. The foundations have in both cases been very difficult to construct, but are now successfully completed. When the new bridge at Aalborg is put into service, it will require some smart work in order to inconvenience shipping as little as possible. The difficulty is that the two bridges are only 30 yards apart and their navigation spans not opposite to each other. On the final day it will be necessary to carry out the following works in as quick succession as possible, the passage being meanwhile entirely closed for shipping: (1) placing in position of the last suspended span of the new bridge, complete in every respect including track, opposite the swing span of the old bridge, (2) transfer of railway traffic from the old to the new bridge, and (3) removal of part of the old bridge opposite the bascule span of the new bridge.

The Proposed Great Belt Bridge

It will be remembered, that certain Danish private engineering firms made a proposal in 1936 to build a bridge across the Great Belt. The bridge, which would be 17·5 km. long and the greatest in the world, was estimated to cost about Kr. 275 million. The preliminary investigations into the bed of the strait, currents, traffic, &c., referred to in THE RAILWAY GAZETTE of January 21, are to be undertaken in the financial year beginning April, 1939, by the Danish State Railways, at an estimated cost of Kr. 600,000. After these investigations have been carried out it is expected that it will be possible to frame a detailed estimate of the cost of building a bridge over the Belt, so that the decision can be taken, whether so vast an expenditure can be justified.

NEW ZEALAND

Educational Facilities

The Railways Department has on its pay-roll over 21,000 employees. Educational work plays a very prominent part in the policy of the department in providing facilities for training this large number in their varied and complex duties. A correspondence school is conducted from the head office in Wellington, covering eight courses for all examinations for employees in every branch of the service. Any employee, no matter what rank he may hold, has the opportunity of studying the courses and qualifying for the higher positions in the service. The courses deal with railway accountancy, statistics, tariff charging, train and station working, and signalling.

The department pays particular attention to the vocational training of its apprentices. All the apprentices at the four main workshops, Otahuhu, Hutt, Addington, and Hillside, are required to attend instructional classes for the first three years of their five-year apprenticeship, three hours a week being set aside for this purpose. The subjects taught comprise mathematics, drawing, and trade theory. Marks are awarded for efficiency in the respective trades, and any apprentice who gains 80 per cent. or more in the final examinations, and 80 per cent. or more for trade efficiency, is granted a diploma allowance of about 6d. a day.

A scholarship examination is held in November each year and those successful are given a four-year course of special training. Subject to certain conditions, a scholarship holder is granted leave with pay to keep terms at a university, and may qualify for a two-year engineering course at Canterbury University.

CZECHOSLOVAKIA

Successful Railway Finances in 1937

According to the Prague *Pravo Lidu* the State Railways showed no deficit upon working in 1937, an accomplishment not attained for many years. Returns issued by the administration for the first eleven months of 1937 show that the number of passengers carried was 207,100,000, this being 31,500,000 or 18 per cent. more than in the corresponding period of 1936. The goods traffic was 49,300,000 tons, or approximately 11,000,000 tons more than in the first eleven months of 1936.

The total State Railways carloadings of 5,860,000 was 760,000 more than in 1936, and was the largest figure recorded since 1930. While the total number of carloadings advanced by 15 per cent., those for export trade advanced by as much as 38 per cent.

XUM

BRITISH RAILWAY STATISTICS

"The Railway Gazette" monthly table for Oct., 1937, as compared with Oct., 1936, compiled from the Ministry of Transport Statement No. 215

Description	Great Britain*	G.W.R.	L.N.E.R.	L.M.S.R.	S.R.
PASSENGER TRAIN TRAFFIC—					
Number of pass. journeys (ex. season ticket holders)	108,230,790	7,508,700	15,361,393	24,721,954	18,635,752
Increase (+) or decrease (—)	— 1,151,683	— 257,005	— 281,737	— 802,696	+ 179,272
Passenger receipts (excluding season ticket holders)	£4,291,384	£548,091	£875,253	£1,354,488	£901,118
Increase (+) or decrease (—)	+ £172,630	+ £12,947	+ £39,645	+ £60,161	+ £51,447
Season ticket receipts	£820,024	£49,557	£138,961	£211,655	£268,915
Increase (+) or decrease (—)	+ £8,722	— £808	— £1,015	— £3,761	+ £7,923
Parcels and misc. traffic receipts (excluding parcels post)	£1,132,381	£207,163	£332,296	£450,126	£122,706
Increase (+) or decrease (—)	— £8,747	+ £3,675	— £11,437	— £415	— £1,423
FREIGHT TRAIN TRAFFIC—					
Freight traffic (tons) (excluding free-hauled)	23,622,448	5,734,176	10,897,014	11,062,401	1,289,591
Increase (+) or decrease (—)	+ 976,808	+ 525,580	— 312,355	+ 479,343	— 71,106
Net ton-miles (excluding free-hauled)	1,380,382,581	257,376,159	467,394,169	562,562,948	55,117,183
Increase (+) or decrease (—)	+ 47,491,754	+ 13,425,024	+ 16,940,474	+ 16,839,336	— 1,966,036
Average length of haul (miles) (excluding free-hauled)	58·44	44·88	42·89	50·85	42·74
Increase (+) or decrease (—)	— 0·42	— 1·96	+ 0·33	— 0·72	+ 0·79
Freight traffic receipts	£7,840,796	£1,375,620	£2,565,198	£3,243,000	£413,081
Increase (+) or decrease (—)	+ £433,226	+ £63,936	+ £175,198	+ £173,000	+ £10,253
Receipts per ton-mile	1·363d.	1·28d.	1·32d.	1·38d.	1·80d.
Increase (+) or decrease (—)	+ 0·029d.	— 0·01d.	+ 0·04d.	+ 0·03d.	+ 0·11d.
Freight train-loads: Average train-load (tons)	131·30	138·54	135·67	129·25	103·40
Increase (+) or decrease (—)	+ 2·51	+ 2·54	+ 1·40	+ 3·12	— 2·36
Net ton-miles—					
Per train engine-hour	951·28	1,029·17	1,007·59	899·31	778·98
Increase (+) or decrease (—)	— 42·60	— 29·67	— 59·70	— 45·37	— 30·78
Per shunting-hour	903·01	815·69	996·05	934·35	585·50
Per total engine-hour	463·26	455·04	500·89	458·25	334·26
Net ton-miles per route-mile per working day	3,036	3,017	3,263	3,577	1,178
Increase (+) or decrease (—)	+ 123	+ 175	+ 139	+ 138	— 45
Wagon-miles. Total	383,138,576	69,169,463	135,374,089	160,187,564	17,778,806
Increase (+) or decrease (—)	+ 2,665,433	+ 1,235,020	+ 4,432,436	— 618,823	— 816,664
Percentage of loaded to total	67·62	68·89	65·06	69·18	68·47
Wagons per train. Total	34·36	34·63	34·77	34·37	31·30
Increase (+) or decrease (—)	— 0·43	— 0·72	— 0·26	— 0·44	— 1·14
Loaded	23·23	23·86	22·62	23·78	21·43
Empty	11·13	10·77	12·15	10·59	9·87
Train-miles. Coaching—Per train hour	15·11	14·09	14·23	14·27	18·03
Per engine-hour	12·13	11·21	10·97	10·95	15·27
Train miles. Freight—Per train-hour	8·53	8·99	8·73	8·15	9·17
Per engine-hour	3·53	3·31	3·74	3·55	3·19
Engine miles. Total	48,274,633	7,685,166	13,511,731	17,974,060	6,243,978
Increase (+) or decrease (—)	+ 1,113,925	+ 225,834	+ 510,278	+ 392,710	+ 107,340
Mileage run by engines. Total train-miles—					
Coaching	23,513,976	3,182,591	5,399,521	7,611,472	4,643,143
Freight	11,151,412	1,997,245	3,892,908	4,660,968	568,047
Engine-hours in traffic. Total	5,312,498	915,857	1,608,941	2,095,016	500,969
Increase (+) or decrease (—)	+ 212,325	— 42,958	+ 95,463	+ 87,962	— 2,702
Shunting miles per 100 train-miles—					
Coaching	7·39	7·05	6·69	7·92	7·81
Freight	72·21	84·32	66·80	67·68	91·94

Passenger Traffic Statistics: Number of journeys, receipts, and receipts per journey (excluding season ticket holders)—October, 1937

Subject	Great Britain	G.W.R.	L.N.E.R.	L.M.S.R.	S.R.	Cheshire Lines	Liverpool Overhead	L.P.T.B.†	Mersey
Full fares—									
Pass. journeys	34,437,884	680,742	1,123,423	1,377,070	2,800,893	14,299	160,738	27,375,580	83,340
Gross receipts	£949,671	£78,355	£137,584	£136,919	£205,814	£2,583	£1,743	£370,032	£1,468
Receipts per pass.	6·62d.	27·62d.	29·39d.	23·86d.	17·64d.	43·35d.	2·60d.	3·24d.	4·23d.
Reduced fares—									
Excursion and week-end—									
Pass. journeys	40,983,493	4,404,831	9,303,879	14,598,248	8,858,548	415,067	87,808	1,602,214	646,830
Gross receipts	£2,501,943	£376,510	£564,425	£942,008	£515,028	£23,788	£891	£35,152	£9,706
Receipts per pass. journey	14·65d.	20·51d.	14·56d.	15·49d.	13·95d.	13·75d.	2·44d.	5·27d.	3·60d.
Workmen—									
Pass. journeys	28,668,963	1,904,005	3,896,064	7,552,269	6,172,158	262,086	231,898	7,452,236	237,824
Gross receipts	£427,674	£28,898	£65,190	£125,632	£102,946	£4,685	£2,027	£84,366	£2,149
Receipts per pass. journey	3·58d.	3·64d.	4·02d.	3·99d.	4·00d.	4·29d.	2·10d.	2·72d.	2·17d.
Other—									
Pass. journeys	4,122,072	514,560	1,034,711	1,185,745	802,521	32,210	49,406	422,058	10,855
Gross receipts	£387,674	£58,444	£103,032	£138,365	£75,603	£3,916	£323	£3,752	£187
Receipts per pass. journey	22·57d.	27·26d.	23·90d.	28·01d.	22·61d.	29·18d.	1·57d.	2·13d.	4·13d.
Total—									
Pass. journeys	108,230,790	7,508,700	15,361,393	24,721,954	18,635,752	723,832	529,850	36,852,088	978,875
Gross receipts	£4,291,384	£548,091	£875,253	£1,354,488	£901,118	£35,126	£4,984	£493,302	£13,529
Receipts per pass.	9·52d.	17·52d.	13·67d.	13·15d.	11·61d.	11·65d.	2·26d.	3·21d.	3·32d.

* All standard gauge railways

† Includes passengers originating on the railway undertakings, and on the Whitechapel and Bow Joint Railway

RAILWAY SPEED DEVELOPMENTS IN 1937

A summary of the world's fastest railway runs, the increase in aggregate high-speed mileage that has taken place during the last seven years in Europe and North America, and the proportions in these figures borne by steam, diesel, and electric haulage, respectively

By CECIL J. ALLEN, M.Inst.T.

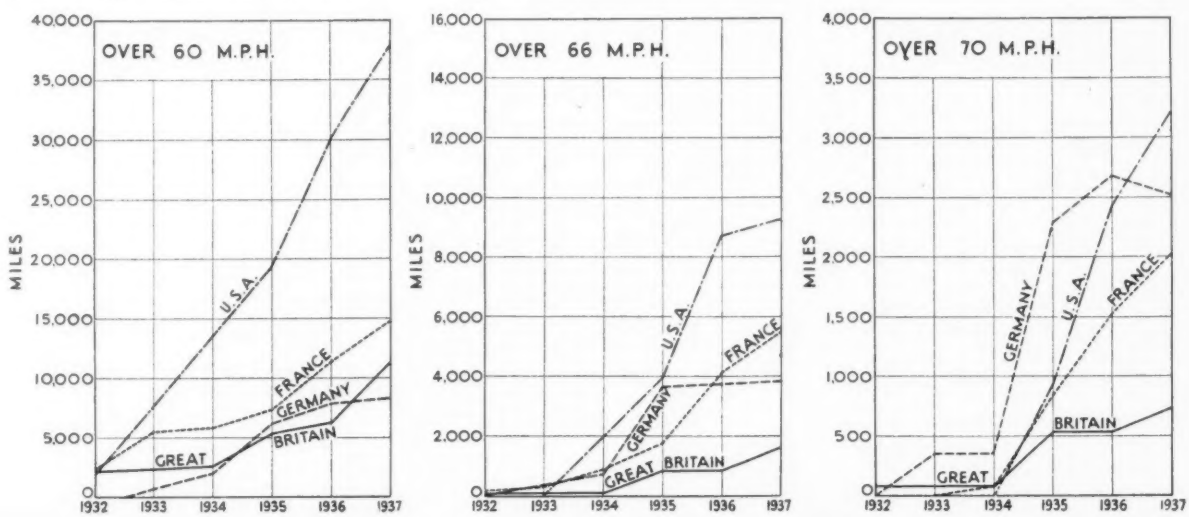
IN the issue of THE RAILWAY GAZETTE for April 30, 1937, the speed developments of the previous year were reviewed, in those countries in which high speed railway services are run, and the present article presents similar figures for the year 1937. Proportionately, it is in Great Britain that considerably the greatest advance in speed was made last year; the tide of acceleration is still flowing strongly in France and the United States, but in Germany there has been little or no increase in speed now for two years past. Another notable fact is that whereas almost the whole of the French speed increase is due to new railcar services operated by diesel or other internal combustion engines, in England the advance is entirely with the help of steam, and in the United States it has been mainly with accelerated steam trains, assisted to a considerable extent by electric acceleration on the Pennsylvania.

The revolutionary advance in post-war railway speed dates from the years 1931 and 1932, and this is strikingly demonstrated in Table A, which shows the increase in the aggregate mileage of high speed schedules in Great Britain, France, Germany, and America from 1931 to 1937 inclusive. Prior to 1933, Germany had no runs timed at as much as 60 m.p.h. from start-to-stop; in three years it had accumulated a total mileage of 6,276 at 60 m.p.h. or over, and by 1937 this figure has increased to 8,235 miles. Great Britain has made her speed advance in leaps; one was from 1931 to 1932, when runs booked at 60 m.p.h. and over rose from 861 to 2,134 miles; a second was between 1934 and 1935, when the increase was from 2,607 to 5,371 miles; but by far the greatest has been from 1936 to 1937, with an increase from 6,226 to 11,228 miles, that is, of 5,000 miles at one stroke. In the United States the increase in mileage has been meteorically rapid. In 1932 only 2,022 miles were scheduled at 60 m.p.h. and over; five years later the total has risen to 37,412 miles. Of runs at 70 m.p.h. and over the first, introduced in the autumn of 1932, was the 71·4 m.p.h. from Swindon to Paddington of the G.W.R. Cheltenham Flyer, which at that time was the fastest railway run in the world; five years later the total at 70 m.p.h. and over for the

TABLE A—PROGRESS IN WORLD RAILWAY SPEED, 1931-1937

Aggregate Mileage of Runs Scheduled Daily at Speeds of 58 m.p.h. and over from start-to-stop

Country	Year	75 m.p.h. and over	70 m.p.h. and over	66 m.p.h. and over	62 m.p.h. and over	60 m.p.h. and over	58 m.p.h. and over
Great Britain ...	1931	—	—	77	77	861	2,395
	1932	—	77	77	634	2,134	4,540
	1933	—	77	77	576	2,375	5,209
	1934	—	77	77	747	2,607	5,537
	1935	—	542	778	1,868	5,371	7,805
	1936	—	542	778	2,265	6,226	9,294
	1937	—	730	1,606	4,152	11,228	16,019
France	1931	—	—	—	95	1,268	4,582
	1932	—	—	148	818	2,373	5,871
	1933	—	—	295	3,198	5,462	8,660
	1934	—	70	820	3,046	5,859	9,891
	1935	—	834	1,755	4,649	7,412	12,090
	1936	—	1,522	4,116	8,592	12,487	17,682
	1937	—	2,016	5,491	10,894	14,678	21,646
Germany ...	1931	—	—	—	—	—	30
	1932	—	—	—	—	—	387
	1933	356	356	356	712	712	814
	1934	356	356	712	2,009	2,836	5,192
	1935	1,542	2,287	3,641	5,118	6,276	11,008
	1936	1,709	2,683	3,708	5,580	7,982	12,056
	1937	1,504	2,513	3,819	5,660	8,235	12,626
United States ...	1932	—	—	—	454	2,022	5,770
	1935	119	935	3,964	11,530	19,279	—
	1936	385	2,422	8,686	19,345	30,047	—
	1937	694	3,194	9,242	24,771	37,412	—



Graphs showing increase in aggregate high-speed mileage, 1932-37

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world has risen to 8,584 miles, of which only 730 miles is found in Great Britain; while what was the world's fastest run in 1932 has now, with no change of its speed in the interim, sunk to the 67th place. The diagrams reproduced in this article show in graphic manner the progress in world speed from 1932 to 1937.

Table B sets out the fastest scheduled runs in the world; all diesel runs timed at 72 m.p.h. and over (50 in all) are shown, with all steam-operated runs (16) at 70 m.p.h. and over, and all electrically-operated runs (44) at 66 m.p.h. and over. Germany claims pre-eminence in both the diesel and steam sections of this table, the Fliegende Kölner making with diesel-operated units the two fastest railway runs in the world, at 82·3 m.p.h. from Berlin (Zoo) to Hanover, and 82·2 m.p.h. from Hanover to Hamn, while the non-stop evening "FD" service from Berlin to Hamburg, timed at 74·2 m.p.h., takes the premier place with steam. After Germany comes the United States, where the City of Denver—a 12-car formation with diesel-electric operation—is booked to make a run at 81·4 m.p.h. from Grand Island to Columbus, and at 80·3 m.p.h. from North Platte to Kearney. Two other German 80 m.p.h. runs make up a total of six at above the "eighty" line and there are in all 19 diesel runs at or over 75 m.p.h., 12 German and 7 American.

With steam haulage the Detroit Arrow of the Pennsylvania, which in 1936 took the leading place with a run at 74·5 m.p.h. from Fort Wayne to Gary, has this year had the Gary stop cut out, and although the overall speed is higher, the restraint on speed between Gary and Englewood brings the average speed down to 73·6 m.p.h. between Fort Wayne and Englewood, and similarly in the reverse direction, in which both Gary and Plymouth stops have been excised. It is for this reason that the German 74·2 m.p.h. takes first place, and the 73·7 m.p.h. run of the same train from Hamburg to Berlin third place; the first place in the U.S.A., and second in the world, with steam haulage, therefore goes to the 73·9 m.p.h. run of the Milwaukee Company's Hiawatha, from New Lisbon to Portage. The 400 of the Chicago & North Western now stops at Racine, on its westbound run between Chicago and Milwaukee, giving this railway a run at 72·8 m.p.h., and the fastest run in Great Britain—the Coronation of the L.N.E.R., with its 71·9 m.p.h. from King's Cross to York—therefore takes seventh place among steam journeys, and sixtieth place, if all forms of motive power be taken into account. If the aggregate mileage of individual railways booked at over 70 m.p.h. with steam haulage alone be reckoned, however, the London & North Eastern Railway is easily first, with its total of 653 miles (against the Pennsylvania 410 miles or the German

TABLE B—THE FASTEST SCHEDULED RUNS IN THE WORLD

Country	Railway	Train	From	To	Distance	Time	Speed
Diesel, etc., Trains					Miles	Min.	m.p.h.
Germany	State	FDt 16 (*a*)	Berlin (Zoo)	Hanover	157·8	†15	82·3
,,	,,	,,	Hanover	Hamm	109·6	80	82·2
U.S.A.	Union Pacific	City of Denver	Grand Island	Columbus	62·4	46	81·4
Germany	State	FDt 15 (*a*)	Hamm	Hanover	109·6	81	81·2
,,	,,	FDt 571	Leipzig	Berlin (Anhalt)	102·2	76	80·7
U.S.A.	Union Pacific	City of Denver	North Platte	Kearney	95·0	71	80·3
Germany	State	FDt 572	Berlin (Anhalt)	Leipzig	102·2	77	79·6
,,	,,	FDt 551 (*c*)	Leipzig	Berlin (Anhalt)	102·2	77	79·6
U.S.A.	Santa Fé	Super-Chief	La Junta	Dodge City	202·4	155	78·3*
Germany	State	FDt 2 (*b*)	Berlin (Lehrter)	Hamburg	178·1	137	78·0
,,	,,	FDt 1 (*b*)	Hamburg	Berlin (Lehrter)	178·1	137	78·0
,,	,,	FDt 45	Breslau	Oppeln	50·7	39	78·0
U.S.A.	Burlington	Denver Zephyr	Aurora	Galesburg	124·5	96	77·8
Germany	State	FDt 15 (*a*)	Hanover	Berlin (Zoo)	157·8	122	77·7
U.S.A.	Union Pacific	"City" Services	North Platte	Grand Island	137·2	106	77·7†
Germany	State	FDt 45	Berlin (Schles.)	Breslau	204·7	160	76·7
,,	,,	FDt 46	Oppeln	Breslau	50·7	40	76·0
U.S.A.	Santa Fé	Super-Chief	Dodge City	Newton	153·1	122	75·3*
,,	Union Pacific	City of Denver	Sterling	Julesburg	75·5	46	75·0
,,	Burlington	Denver Zephyr	Holdrege	McCook	77·1	62	74·6
Germany	State	FDt 37	Osnabrück	Bremen	75·8	61	74·5
U.S.A.	Burlington	Twin City Zephyrs	East Dubuque	Prairie du Chien	54·6	44	74·5‡
,,	Union Pacific	City of Denver	Kearney	Grand Island	42·2	34	74·5§
Germany	State	FDt 46	Breslau	Berlin (Schles.)	204·7	165	74·4
U.S.A.	Burlington	Denver Zephyr	Hastings	Lincoln	96·4	78	74·2
Germany	State	FDt 38	Hamburg	Bremen	71·7	58	74·2
U.S.A.	Santa Fé	Super-chief	Dodge City	La Junta	202·4	164	74·0*
,,	Union Pacific	City of Denver	Kearney	North Platte	95·0	77	74·0
Germany	State	FDt 45 & 46	Heydebreck	Oppeln	25·8	21	73·7§
U.S.A.	Burlington	Denver Zephyr	Holdrege	Hastings	54·8	45	73·6
,,	,,	,, ,,	,,	Denver	254·4	208	73·4
France	P.L.M.	No. 4	Dijon	Laroche	99·1	81	73·3
U.S.A.	Santa Fé	Super-chief	Gallup	Winslow	127·9	105	73·1*
,,	Union Pacific	City of Denver	La Salle	Sterling	93·6	77	72·9
Germany	State	FDt 37	Bremen	Hamburg	71·7	59	72·9
U.S.A.	Union Pacific	City of Denver	North Platte	Julesburg	81·2	67	72·7
France	P.L.M.	No. 3	Laroche	Dijon	99·0	82	72·4
,,	Nord	No. 307	Paris	Longueau	78·3	65	72·3
U.S.A.	Burlington	Denver Zephyr	McCook	Holdrege	77·1	64	72·3
,,	Union Pacific	"City" Services	Grand Island	North Platte	137·2	114	72·2†
Germany	State	FDt 38	Bremen	Osnabrück	75·8	63	72·2
France	Etat	2 runs	Rouen	Paris	86·6	72	72·1‡
,,	,,	2 runs	Paris	Havre	141·5	118	72·0‡
,,	,,	2 runs	Havre	Paris	141·5	118	72·0‡
Steam-operated Trains							
Germany	State	FD 24	Berlin	Hamburg	178·1	144	74·2
U.S.A.	Milwaukee	Hiawatha	New Lisbon	Portage	43·1	35	73·9
Germany	State	FD 23	Hamburg	Berlin	178·1	145	73·7
U.S.A.	Pennsylvania	Detroit Arrow	Englewood	Fort Wayne	141·0	115	73·6
,,	,,	,, ,,	Fort Wayne	Englewood	141·0	115	73·6
,,	Chicago & N.W.	The 400	Chicago	Racine	61·9	51	72·8
Great Britain	L.N.E.R.	Coronation	King's Cross	York	188·2	157	71·9
,, ,,	G.W.R.	Cheltenham Flyer	Swindon	Paddington	77·3	65	71·4
U.S.A.	Pennsylvania	Liberty Limited	Plymouth	Fort Wayne	64·2	54	71·3
,,	,,	General	Plymouth	Fort Wayne	64·2	54	71·3
,,	Illinois Central	Daylight	Kankakee	Gibson City	54·1	46	70·6
Great Britain	L.N.E.R.	Silver Jubilee	King's Cross	Darlington	232·3	198	70·4
,, ,,	,,	,, ,,	Darlington	King's Cross	232·3	198	70·4
U.S.A.	Milwaukee	Hiawatha	New Lisbon	La Crosse	59·8	51	70·4
,,	,,	,,	La Crosse	New Lisbon	59·8	51	70·4
France	P.O.-Midi	Sud Express	Poitiers	Angoulême	70·0	60	70·0

* Once weekly. † On alternate days each week. ‡ Two runs daily.
§ Two runs daily, one in each direction.

(*a*) Fliegende Kölner. (*b*) Fliegende Hamburger. (*c*) Fliegende Münchener

TABLE B—THE FASTEST SCHEDULED RUNS IN THE WORLD—*contd.*

Country	Railway	Trains	From	To	Distance	Time	Speed
Electrically-operated Trains					Miles	Min.	m.p.h.
U.S.A. ...	Chicago, N.S. & M.	2 runs ...	Waukegan	Kenosha ...	15·0	12	75·0*
,, ...	Pennsylvania	1 run... ...	Newark ...	North Philadelphia	76·0	64	71·3
,, ...	,,	1 run... ...	,, ...	,, ,,	76·0	65	70·2
,, ...	,,	6 runs ...	,, ...	Trenton ...	48·1	42	68·7†
,, ...	,,	2 runs ...	Baltimore ...	Wilmington	68·5	60	68·5*
,, ...	,,	2 runs ...	Newark ...	North Philadelphia	76·0	67	68·1*
U.S.A. ...	Pennsylvania	2 runs ...	Newark ...	Princeton Jc	38·4	34	67·8*
,, ...	,,	2 runs ...	Baltimore	Wilmington	68·5	61	67·4*
,, ...	,,	1 run... ...	Newark ...	North Philadelphia	76 0	68	67·1
,, ...	,,	6 runs ...	,, ...	Trenton ...	46·1	43	67·1†
,, ...	,,	1 run... ...	Trenton ...	North Philadelphia	27·9	25	67·0
Germany ...	State ...	4 runs ...	Breslau ...	Königszelt	30·1	27	66·9‡
France ...	P.O.-Midi ...	Sud Express	Paris (Q. d'Orsay)	St. Pierre-des-Corps.	145·9	131	66·8
U.S.A. ...	Chicago, N.S. & M.	1 run... ...	Kenosha ...	Racine ...	10·0	9	66·7
France ...	P.O.-Midi ...	No. 15 ...	Les Aubrais	Blois ...	36·6	33	66 5
U.S.A. ...	Pennsylvania	6 runs ...	Baltimore ...	Wilmington	68·5	63	66·3†
,, ...	,,	3 runs ...	New Brunswick	Trenton ...	25·4	23	66·3§
France ...	P.O.-Midi ...	No. 95 ...	Paris (Austerlitz)	Les Aubrais	73·8	67	66·1
U.S.A. ...	Pennsylvania	1 run... ...	Newark ...	North Philadelphia	76·0	69	66·1

* Two runs daily. † Six runs daily. ‡ Four runs daily. § Three runs daily

356 miles), and when it is recalled that the L.N.E.R. streamline services, three in each direction, between Hatfield and Doncaster are booked daily to cover a total of 830 miles at but a fraction under 75 m.p.h., it will be realised that this British company has made a greater advance with steam in the ultra high speed realm than any other, either in this country or abroad.

Most of the fast running with electricity is monopolised by the electrified lines of the Pennsylvania Railroad between New York, Philadelphia, Baltimore, and Washington, where the two first long-distance timings on record with electric haulage in excess of 70 m.p.h. have now been introduced. The inter-urban Chicago, North Shore & Milwaukee electric line, with its numerous stops and short runs, has two 15-mile runs booked at 75 m.p.h. from start-to-stop, but these are hardly practical, and any loss of time so occasioned is probably recouped on the next succeeding section. Twenty-six fast American electric runs precede the fastest in Germany, where the high speed Munich-Augsburg-Stuttgart service has been slowed down since 1936; immediately after the quickest German runs comes the fastest in France with electric haulage, of the Paris-Orleans Sud Express between Paris (Quai d'Orsay) and St. Pierre-des-Corps. This run includes the usual slow travelling between Quai d'Orsay and Austerlitz, and also a conditional stop at Les Aubrais.

In Table C the high speed mileages of individual companies are shown, the figures being the aggregate in each case of runs booked from start-to-stop at speeds of 70 m.p.h. and over, 64 m.p.h. and over, 62 m.p.h. and over, and 60 m.p.h. and over respectively. The mile-a-minute mileages in the last right-hand column provide the basis of the consecutive order, and this arrangement has some curious results. For example, the L.M.S. Railway, by the thoroughgoing nature of its Midland Division accelerations in September last, moves up from eighth place in 1936 to fourth in 1937; but the bulk of the accelerations were designed to bring the train schedules just within the 60 m.p.h. limit and no more, with the result that out of the first seventeen railways in this Table, the L.M.S. is one of the only two with no 70 m.p.h. runs (the New York Central being the other), and at 64 m.p.h. and over the 218 miles of the L.M.S. takes twenty-fifth place among the world's railways, and compares, say, with the 6,260 miles of the Pennsylvania, the 4,173 miles of the German State Railway, the 3,297 miles of the Burlington, the 2,003 miles of the French Etat, the 1,752 miles of the French Nord, or the all-steam 1,293 miles of the L.N.E.R.

With these figures are shown the total route mileages owned or operated by each railway, so that the speed figures of the smaller systems may be better appreciated. On the American lines west of Chicago, where the high-speed services between Chicago and the Pacific Coast make one complete return journey every five days, the due proportion only of the mileage so run is credited to each company concerned, in order to reduce the figures to the daily basis of all other runs. The Pennsylvania Railroad heads Table C by a substantial margin, and two-thirds of the total of 11,394 miles at 60 m.p.h. and over (7,677 to 3,717 miles) is achieved by the electric services—a remarkable example of inter-city electrification put to full high speed use. The German State railway takes second place, but it will be appreciated that this unification of all the pre-war German lines forms a system three times the size of the biggest other railways in this table. The New York Central next follows, and after that, as previously mentioned, the L.M.S.R.; then comes the Chicago, Burlington and Quincy—with its exclusive diesel-electric high-speed mileage—and next, in a creditably high place in relation to route mileage, the Northern of France.

TABLE C—AGGREGATE HIGH SPEED MILEAGE OF THE WORLD'S RAILWAYS, 1937

Country	Railway	Total Route Mileage*	Mileage Scheduled Daily at			
			70 m.p.h. and over	64 m.p.h. and over	62 m.p.h. and over	60 m.p.h. and over
		Miles	Miles	Miles	Miles	Miles
U.S.A. ...	Pennsylvania	11,064	562	6,260	8,680	11,394
Germany ...	State	33,461	2,513	4,173	5,660	8,235
U.S.A. ...	New York Central ...	11,472	—	1,472	2,710	6,730
Gt. Britain ...	L.M.S.R.	6,895	—	218	1,287	6,228
U.S.A. ...	Burlington	9,038	1,279	3,297	3,701	4,121
France ...	Northern	2,484	459	1,752	2,362	3,638
,, ...	State	5,718	1,132	2,003	3,296	3,491
Gt. Britain ...	L.N.E.R.	6,372	653	1,293	1,899	2,897
U.S.A. ...	Union Pacific	10,067	794	1,572	1,853	2,538
France ...	Paris-Orleans	4,405	70	881	1,417	2,324
U.S.A. ...	C. & N.W.	8,333	62	1,209	1,747	2,294
France ...	Eastern	3,187	157	1,095	1,526	2,242
,, ...	P.L.M.	6,155	198	1,354	1,752	2,153
Gt. Britain ...	G.W.R.	3,782	77	333	966	2,103
U.S.A. ...	Milwaukee	11,124	206	624	1,293	1,875
U.S.A. ...	C.N.S. & M.	136	30	264	500	1,623
Italy ...	State	10,079	131	381	862	1,317
U.S.A. ...	Penn.-Rdg.-Seashore ...	413	—	391	731	1,203
,, ...	Baltimore & Ohio ...	6,440	—	335	770	1,106
Belgium ...	National	3,011	—	219	257	839
France ...	Alsace-Lorraine ...	1,402	—	250	541	830
U.S.A. ...	Wabash...	2,447	—	161	192	755
Denmark ...	State	1,764	—	77	473	741
U.S.A. ...	Santa Fé	9,444	120	255	471	715
,, ...	Illinois Central... ...	6,848	93	364	419	587

* Standard 4-ft. 8½-in. gauge. In the case of principal American railways, includes subsidiary companies

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TABLE D—A COMPARISON OF HIGH SPEED AND ROUTE MILEAGE (INDIVIDUAL RAILWAYS)

Country	Railway	Speed Mileage†	Route Mileage*	Per cent.‡
United States ...	Chicago, North Shore and Milwaukee	1,623	136	1,193
,, ,, ...	Pennsylvania-Reading-Seashore ...	1,203	413	291
France	Northern	3,638	2,484	147
United States ...	Pennsylvania	11,394	11,064	103
Great Britain ...	London Midland and Scottish ...	6,228	6,895	90
France	Eastern	2,242	3,187	71
,, ...	State	3,491	5,718	61
,, ...	Alsace-Lorraine	830	1,402	59
United States ...	New York Central	6,730	11,472	58
Great Britain ...	Great Western...	2,103	3,782	56
France	Paris-Orleans	2,324	4,405	53
United States ...	Chicago, Burlington and Quincy ...	4,121	9,038	46
Great Britain ...	London & North Eastern	2,897	6,372	45
Denmark ...	State	741	1,764	42
France	Paris-Lyons-Mediterranean	2,153	6,155	35
United States ...	Wabash...	755	2,447	31
Belgium... ...	National	839	3,011	28
United States ...	Chicago and North Western ...	2,294	8,333	27
,, ,, ...	Union Pacific	2,538	10,067	25
Germany ...	State	8,235	33,461	24
United States ...	Baltimore and Ohio	1,106	6,440	17
,, ,, ...	Chicago, Milwaukee, St. Paul and Pacific	1,875	11,124	16
Italy	State	1,317	10,079	13
United States ...	Illinois Central	587	6,843	9
,, ,, ...	Atchison, Topeka and Santa Fé ...	715	9,444	8

* Standard 4-ft. 8½-in. gauge. † Booked daily at 60 m.p.h. and over. ‡ Speed mileage as a percentage of route mileage

In Table D the high speed mileages of each railway (*i.e.*, the total daily mileage booked at over 60 m.p.h. from start-to-stop) are given as a percentage of route mileage, which gives a better index to individual enterprise than the preceding table. The inter-urban Chicago North Shore & Milwaukee electric—unique of its kind—now leaps to the head of the Table, and is followed by the Pennsylvania—Reading—Seashore, which is a combination of the interests of the Pennsylvania and Reading Railroad between Philadelphia and the Atlantic coast resorts, operating a very fast town to coast service over a relatively small mileage of lines. The Northern of France takes a suitably high place, and the Pennsylvania, despite the vast size of its system, and the mountainous character of all its central section, is as high as fourth place. These are the only four railways in which high speed mileage is greater than 100 per cent. of route mileage. The L.M.S.R., however, is but a little under "par" figures, and has moved up from tenth place in 1936, when the percentage was only 38, to fifth place with 90 per cent. in 1937—a praiseworthy achievement. Other substantial increases in percentage are the Alsace-Lorraine (39 to 59), the New York Central (43 to 58), the Paris—Orleans (24 to 53, partly due to taking in 1937 the Paris—Orleans mileage only of the Paris—Orleans—Midi group, as it is over this that all the high speed running is performed), the L.N.E.R. (26 to 45); and Denmark and Belgium now make their appearance well up this list.

In Table E the mileage figures appear correspondingly as a percentage of the aggregate route mileage of each country concerned in providing high speed rail travel. Here it is of interest that the British accelerations of 1937 have brought this country well to the head of the table, displacing France from that position. It will be seen that the British 55 per cent. in 1937 compares with 30·5 per cent. in 1936. Belgium similarly displaces Germany, with an increase from 16·7 to 26·1 per cent. in the former case; and Denmark, with an increase from 5·8 to 22·3 per cent., rises above the United States and Italy.

In the last Table (F), an analysis is given of the proportions of the high speed mileage of each country that are operated respectively with steam, diesel, and electric power. Here the changes, as compared with 1936, are extremely interesting. While the percentages of the grand totals for which diesel power is responsible have fallen, at 62 m.p.h. and over, from 44 to 38½, and at 60 m.p.h. and over from 32½ to 28, those with steam haulage have risen from 38½ to 41, and from 51 to 55 per cent. respectively—a striking indication of the vigorous reply that is now being made by steam to the onset of its newest competitor. The electric percentage has also slightly increased. It will be noticed that in aggregate mileage in all ranges of speed the United States heads each section of this table; as regards steam haulage, however, Great Britain, in the second place, is far ahead of both France and Germany.

TABLE E—A COMPARISON OF HIGH SPEED AND ROUTE MILEAGE (COUNTRIES)

Country	Speed Mileage*	Route Mileage†	Per cent.‡ 1936	Per cent.‡ 1937
Great Britain	11,128	20,121	30·5	55·8
France ...	14,678	40,348	31·0	36·4
Belgium ...	839	3,209	16·7	26·1
Germany ...	8,235	36,256	21·8	22·7
Denmark ...	741	3,332	5·8	22·3
United States	37,412	245,752	12·2	15·2
Italy	1,317	11,383	6·5	12·5
Switzerland ...	112	3,677	2·8	2·8

* Booked daily at 60 m.p.h. and over † All gauges. ‡ Speed mileage as a percentage of route mileage

TABLE F—COMPARISON OF WORLD'S SCHEDULED HIGH SPEED STEAM, DIESEL,* AND ELECTRICALLY-OPERATED MILEAGE, 1937

Country	70 m.p.h. and over	67 m.p.h. and over	64 m.p.h. and over	62 m.p.h. and over	60 m.p.h. and over
	Miles	Miles	Miles	Miles	Miles
Steam-operated					
United States	732	2,271	6,133	10,043	18,892
Great Britain	730	1,606	1,844	4,152	11,228
France	70	147	828	3,221	5,796
Germany	356	793	915	2,091	4,380
Belgium	—	—	219	219	640
Italy	—	—	—	—	234
Canada	—	—	—	—	71
Diesel-operated					
United States	2,280	3,827	6,588	7,996	9,220
France	1,946	4,123	5,914	6,584	7,289
Germany	2,157	2,564	2,851	2,943	3,049
Denmark	—	—	—	473	741
Italy	—	—	—	88	309
Czechoslovakia	—	—	—	—	88
Great Britain	—	—	20	20	20
Electrically-operated					
United States	182	1,375	4,596	6,732	9,300
France	—	—	693	1,089	1,593
Germany	—	—	407	626	806
Italy	131	261	381	774	774
Switzerland	—	—	—	—	112
Steam-operated total	1,888	4,817	9,939	19,726	41,241
Diesel-operated total	6,383	10,514	15,450	18,192	20,915
Electrically-operated total	313	1,636	6,077	9,221	12,585
GRAND TOTAL	8,584	16,967	31,466	47,139	74,741
Steam haulage, per cent.	22½	28½	31½	42	55
Diesel haulage, per cent.	74	62	49	38½	28
Electric haulage, per cent.	3½	9½	19½	19½	17

* Includes other internal-combustion vehicles

THOMAS BRASSEY: PIONEER RAILWAY CONTRACTOR

(*From a correspondent*)

For the railway system, the United Kingdom and the world are indebted to three classes of active agents: railway promoters, railway engineers, and railway makers. It will scarcely be contested that the late Thomas Brassey was at the head of the third class.—From "The Railway News" of December 17, 1870.

ONE of the most interesting of the great railway contractors of the early days of railway construction was Thomas Brassey, who was born at Buerton, near Chester, on November 7, 1805. At the age of 16 he was apprenticed to a land surveyor named Lawton, and on the completion of his apprenticeship became a partner in the business, in charge of the Birkenhead branch. In addition to being an estate agent and land surveyor, Brassey owned the Storeton quarry, near Birkenhead. In 1833 he was visited by George Stephenson, who was seeking supplies of stone for viaduct construction. At this period it was customary for railway companies to build their own lines, and as Stephenson found it impossible personally to supervise the whole of the work for which he was responsible, he decided to let out portions to contractors. On his visit to Storeton quarry, he formed the opinion that Brassey would make a reliable railway contractor.

The opportunity soon came, for, after the incorporation of the Grand Junction Railway in 1833, George Stephenson was appointed Chief Engineer with Joseph Locke as his chief assistant. Stephenson then decided to test his plan of sub-letting portions of the work, and suggested to Brassey that he should consult his bankers and, with their financial support, tender for some of the more important works included in the Grand Junction Railway. Brassey liked the proposal, and found his bankers at Chester willing to support him. Shortly afterwards, therefore, he submitted a tender in respect of a large viaduct to be built across the Dutton valley, but lost this contract on account of his price being too high. He then submitted a tender for the construction of the Penkridge viaduct, and this was accepted. Thus he began a notable career of railway contracting which eventually justified *The Railway News* using in its obituary appreciation the words at the head of this column.

Before either the Dutton or the Penkridge viaduct was built, Stephenson retired from the Grand Junction Railway, and was succeeded as Chief Engineer by Joseph Locke, who had been his chief assistant. Brassey and Locke soon became close friends. On the completion of the Grand Junction Railway, Locke became Chief Engineer to the London & Southampton Railway, the construction of which involved contracts to the value of £4,000,000, and the employment of some 3,000 men. Brassey submitted tenders for various works in the scheme, and most of them were successful. In order to be situated more conveniently for his work Brassey removed to London in 1836. He soon acquired a big reputation, and, before the London & Southampton line was completed, was also engaged on other lines in Scotland and the north of England.

Brassey has executed many great railway works on the Continent, but at the outset he was not keen to undertake them. The first tender he sent in for a French line was at a price he believed would be rejected; it was, nevertheless, the lowest. The French railway authorities supposed it impossible that he could execute the works at the price, but he did and realised a very handsome profit. The competitors were French contractors who did not then know much of railway making. In conjunction with W. Mackenzie, Brassey contracted in 1840 to build the Paris & Rouen Railway, of which Locke was engineer; the works were begun in July, 1841, and the line opened in May, 1843. They then undertook to build the Rouen & Havre Railway in two years, the task including the construction of the Barentin viaduct. This structure has 27 arches and is approximately one-third of a mile in length, 50 ft. in width and 112 ft. in height. When it was nearly completed a terrific storm occurred and the structure collapsed. Although informed by French lawyers that he was in no way responsible for the disaster, Brassey regarded himself as under a moral obligation to rebuild the viaduct, which he did in about six months at a cost to himself of approximately £50,000.

At this period Brassey was experiencing the busiest time of his career; and at one time he was co-operating with others in the construction of no fewer than six different French railways, in addition to carrying out a similar number of railway contracts on his own account in Great Britain. The capital involved in these contracts was said to be approximately £36,000,000.

In November, 1846, the newly-formed Great Northern Railway appointed Brassey as contractor for the Peterborough—London section of its line, with a severe penalty clause for failure to complete the works within the stipulated time. This job included laying a track across three miles of fenland near Whittlesea Mere, and Brassey entrusted this particular portion of the line to his capable assistant, Ballard. The manner in which they laid the track is interesting. At first they proposed to carry the line across the bog on bridges built on piles, for which a special foundation had to be prepared; but this scheme was abandoned. In an account of the work Ballard says:—

> The peat was 22 ft. deep, and I pointed out to the engineer the difficulty of sufficiently bracing the piles, their tops being only about 3 ft. above the bog. The piling was given up, and we made rafts of timber on which brick walls were built. These gradually sank, care being taken to dispose the weight so as to keep the walls perpendicular, and finally these walls were tested with rails of a greater weight than that of any train that could pass over them. We did not load too quickly, but left it; we put a load on, and left it; and then the water had a chance of escaping. We only compressed the peat beneath the raft, without displacing it, for if we had once displaced it we must have gone down to the solid.

In association with the English firm of Peto and Betts, Brassey was concerned with the construction of the Grand Trunk Railway of Canada. In the course of his career Brassey was concerned in a large number of partnerships, and an instance of the liberality with which he treated his business associates is provided by the readiness with which, at the time of the financial crisis of 1866, he offered to place half-a-million of money at the disposal of Sir Morton Peto. Finding that the failure of the firm was inevitable, he took over the whole of the contracts and undertook their completion. During 1867 Brassey made an extensive business tour and was present at the opening of the railway on the Fell system over Mont Cenis, which had been built under his supervision. He died at Hastings on December 8, 1870, and was buried five days later at Catsfield, Sussex—the home of his eldest son, afterwards Lord Brassey.

XUM

ZURICH MAIN STATION IMPROVEMENTS

All-electric signalling installed

THE last stage of an extensive programme of enlargement and modernisation at Zurich-Hauptbahnhof (Main station) was completed when the new signalling equipment was brought into operation on September 30 last year. The station is now the largest and most up to date in Switzerland. The earliest station in Zurich was the terminus of Zurich—Baden line, the first Swiss railway, and was opened in 1847. A new station was built in 1860, was substantially enlarged towards the end of the century, and again after the lines using it had been taken over by the Swiss Federal Railways in 1901. It became apparent, however, over 20 years ago that a further extension of the passenger and goods stations would be necessary in view of the rapidly-increasing traffic, but owing to the high cost of carrying out the work in accordance with the plans prepared, the matter was frequently postponed, and it was not until 1924 that revised plans were approved.

New Works Involved

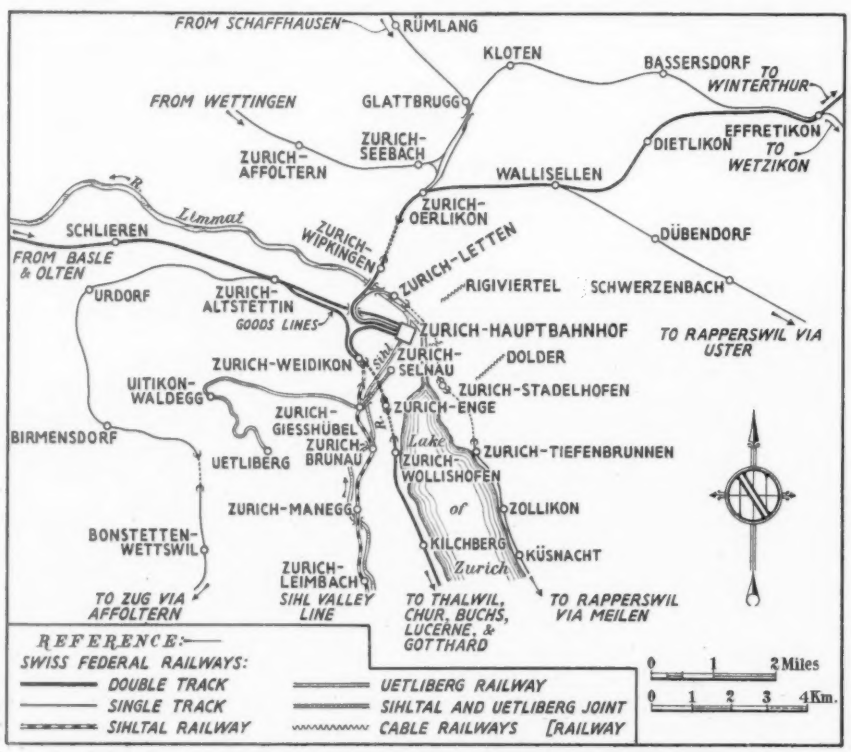
Work began in the following year with the construction of new engine sheds about ¾-mile from the terminus, near the Brugg line. On their completion, the old running sheds near the River Sihl were pulled down, and the more important work of building new platforms and lengthening the old ones was taken in hand. This involved the construction of new bridges over the Sihl to carry the additional platforms and tracks. The old platforms were rebuilt and, like the new ones, covered throughout their whole length by low arched roofs of steel and glass. A new concourse, on which all the platforms abut (the station being a terminal), was made by pulling down a portion of the old station building and covering the space with a glass roof. A portion of the space between the concourse and the present station buildings is used for the various luggage offices, and the remainder forms an additional circulating area.

Improved Accommodation now Provided

As now completed, the passenger station has 7 two-faced platforms, varying in length from 985 to 1,150 ft. and serving 14 tracks; and a short one-sided platform on the north side which is not in regular use. With the exception of those between platforms 4 and 5, each pair of tracks has a separate luggage and post-office platform, at each end of which a hoist connects with an underground passage; the one at the further end leads to the adjacent post office. The passenger platforms are assigned as follow:—

1.—Lucerne and Gotthard line, Italy.
2.—Chur, Buchs and Austria.
3.—Winterthur (local trains) and Schaffhausen.
4.—Romanshorn, St. Gall, and Uster-Rapperswil lines.
5.—Meilen, Rapperswil and Linthal line.
6.—Basle, France and Germany.
7.—Olten and western Switzerland.

Extensive enlargements and improvements in the layout, and particularly the provision of new crossover lines and groups of carriage sidings, have appreciably facilitated the handling of traffic. Some of these alterations were made in 1927, when the Thalwil line was rebuilt on an entirely different alignment through the city of Zurich; others are approaching completion.



Map of railways in the vicinity of Zurich

All the lines entering Zurich are electrically worked on the standard 15,000-volt single-phase overhead system, and the following are the dates of electrification of the sections involved:—

Zurich—Zug via Thalwil, March 5, 1923.
Zurich—Olten, January 21, 1925.
Zurich—Winterthur (both routes), August 6, 1925.
Zurich—Rapperswil via Meilen, May 15, 1926.
Zurich—Schaffhausen, December 15, 1928.
Zurich—Rapperswil via Uster, October 2, 1932.
Zurich—Zug via Affoltern, October 15, 1932.

Most trains are locomotive-hauled, but a few multiple-unit sets are in service between Zurich and Richterswil, to which point there are frequent local trains.

Signalling Equipment

The new signalling equipment has been provided by Signum A.G., Wallisellen, working in co-operation with the Vereinigte Eisenbahn-Signalwerke, of Berlin-Siemensstadt. Colour-light signals of the Swiss Federal Railways

Above: Starting colour-light-signals with shunting signals above, and brake test "right away" indicators beneath. (The white cross sign means "shunting prohibited," the white bar "shunting permitted")

Right: Subsidiary signal box for controlling yard shunting movements

Below: Exterior of principal signal box, at Zurich, with multiple-lamp route indicators on bridge

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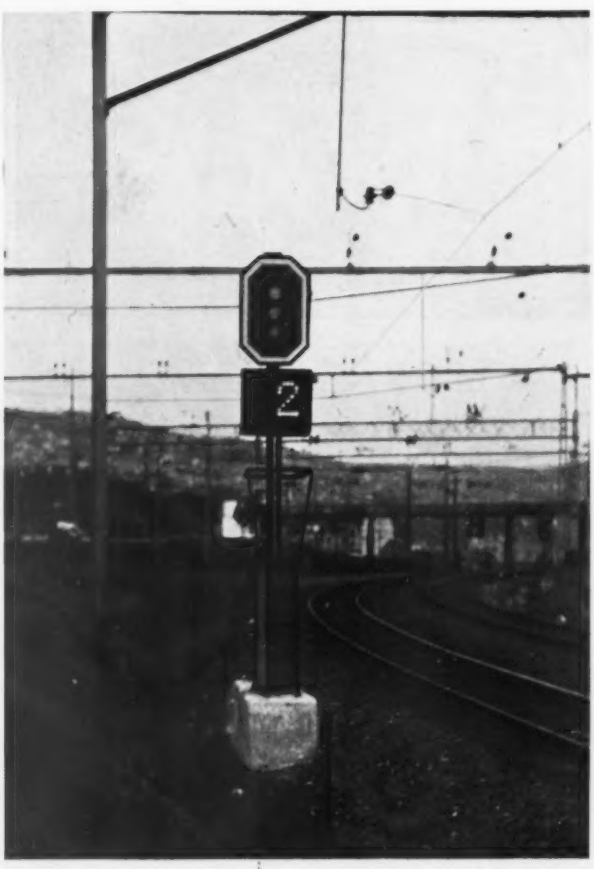
standard type, viz., showing the same colours as the night aspects of the ordinary semaphore and disc signals, are used for regular train movements. Shunting signals, which are position-lights, show a vertical white line for "shunting permitted" and a white cross for "shunting prohibited," corresponding to the two aspects of the older type of shunting signal, which has two blue-and-white arms placed in the crossed or vertical positions. All the signals are fed from the traction supply, but are automatically switched over to the town supply should the former fail.

Train movements are controlled from a leading signal box situated on a steel bridge spanning all the tracks a short distance beyond the platform ends. This is a two-storey box, with 224 levers arranged in 4 rows, and mechanical interlocking; over 1,000 relays and other items of apparatus are housed in the lower portion, and are easily accessible for repairs. A second box controls the points in the outer portion of the station, and three boxes for shunting movements are situated in the vicinity of various groups of sidings.

Interior of principal signal box at Zurich, showing the multiple-row power frame, with space for 224 levers, describers and lock-and-block apparatus



Home signal with platform route indicator from Thalwil line

Route Indicators

To warn the ground staff on which track a train is expected, a system of indicators, supplied by the firm of Gfeller A.G., Berne, has been introduced, and consists of a series of panels on which illuminated figures appear as soon as the points and signals have been set for the corresponding track. These indicators are placed on the bridge supporting the principal signal box, and on two other bridges further out in the station yard.

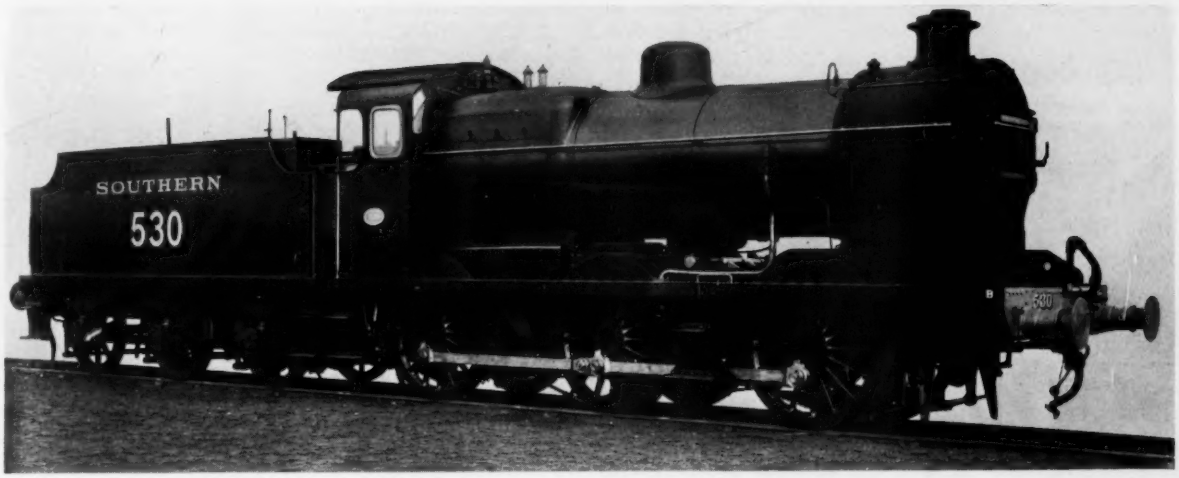
On the passenger platforms, colour-light indicators, of a type which has been in use for some time past at Olten and certain other large stations, have been fitted to enable the platform staff to give drivers the various signals necessary for the brake tests, and the signal to start in lieu of the *palette*, or *Befehlstab*, as it is called in Germany, usually shown by the stationmaster or his representative as authority to proceed. These indicators have proved very successful elsewhere and save considerable time, especially when platforms are crowded.

Further extensions of the sorting sidings, and certain other improvements, including a direct connection between the Winterthur line and the goods station, have been planned but cannot be carried out as long as there is no improvement in the Federal Railways' financial situation. In the meantime, the new signalling and other facilities should prove valuable in assisting the station staff to cope more easily with the heavy traffic handled, especially at week-ends, when numerous specials are run and regular trains frequently arrive or leave in two sections.

ALGERIAN RAILWAYS FARE REDUCTIONS.—The Algerian Railways will issue from April 8 to 24 special Easter return tickets at 50 per cent. reduction for visitors to tourist districts in Southern Algeria.

NEW 0-6-0 TYPE FREIGHT ENGINES, SOUTHERN RAILWAY

A general utility design fitted for passenger train working when required



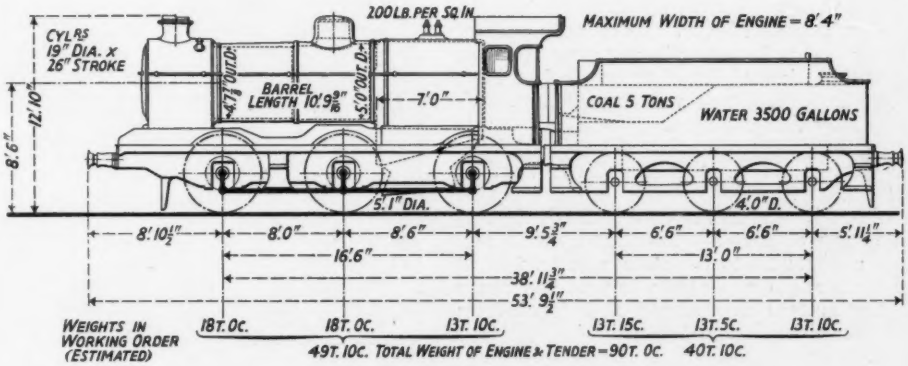
THE first of a series of ten new goods engines has just been turned out of the works of the Southern Railway at Eastleigh. They were designed by Mr. R. E. L. Maunsell, the former Chief Mechanical Engineer, and are considerably more powerful than the old engines they will replace, the tractive effort being 26,157 lb. at 85 per cent. of the boiler pressure. The boiler is of the Belpaire pattern, carrying a working pressure of 200 lb. per sq. in., and the grate area is 21·9 sq. ft. A Sinuflo superheater is fitted, having an area of 185 sq. ft. The 19-in. × 26-in. inside cylinders have long-travel piston valves of 10 in. dia., operated by Stephenson valve motion through rocking levers; steam reversing gear is provided. Engine and tender are fitted with vacuum brake.

The tender is of the standard " N " class, and carries 3,500 gal. of water and 5 tons of coal. The total weight of engine and tender in full working order is 90 tons. Steam sanders are placed in front of the leading coupled wheels, and behind the driving wheels; while a de-sander, or rail washer, is provided behind the trailing coupled wheels.

The engines are of the general utility pattern, and are equipped with steam heating connections at each end for passenger train working when required. Additional particulars are as follow:—

	Sq. ft.
Heating surface, tubes—	
Large and small	1,125
Firebox	122
Total (evaporative)	1,247
Superheater	185
Combined heating surfaces	1,432

The figures relating to the wheelbase of the engine and tender, and to the total and distributed weights, are given on the accompanying diagram. The engines are known as the " Q " class. We are indebted to Mr. O. Bulleid, Chief Mechanical Engineer of the Southern Railway, for the above particulars, and the originals from which the illustrations were reproduced.



General arrangement diagram of new 0-6-0 freight engines, S.R.

THE PAHL HOT-SPRAY PAINTING PROCESS

Demonstration of system at Liverpool Street, London Transport

THE Pahl hot-spray painting process, which has been applied successfully in the course of the last ten years to a number of important steel structures in Germany and Belgium, was demonstrated for the first time in Great Britain on December 14 last, when, with the co-operation of the London Passenger Transport Board, a trial was conducted on a section of steel trough roofing at Liverpool Street (Metropolitan) station.

Paint being applied to steel trough roofing at Liverpool Street station (Metropolitan Line)

One of the advantages possessed by the Pahl process consists in the use of a binding agent, which has proved to be impervious to water, composed of highly viscous stand oil in conjunction with resin and wax. For producing paints of the colour desired, all pigments hitherto used (*e.g.* white lead, white of zinc, zinc oxide, graphite, as well as all the heat-proof colour pigments) are suitable, and a special combination of these materials has been prepared for the Pahl hot-spray painting process. A single coat applied by this process is claimed to be rust-proofing and of a durability twice that of a normal four-fold coat. The process is applicable to stone or wood as well as to steel surfaces.

The paint, which is placed in an electrically heated container in the form of paste, is liquefied by heat and sprayed through a pistol on to the surface to be treated by compressed air through a pilot gas flame. By means of this flame the surface is warmed and freed from moisture. The conditions for paint application are thus improved, and work may be performed even in unfavourable weather.

During the demonstration at Liverpool Street roughly 8 sq. yd. of steel trough roofing were covered in 70 min., in rather difficult circumstances and in bad lighting conditions; the remnants of an old whitewash coat on the steel troughing further retarded the speed of working due to the absorbent properties of the whitewash. Calor gas (supplied by the Calor Gas (Distributing) Co. Ltd., London) was used at this trial. From the photograph reproduced it will be noticed that the operator works not only in comfort, but also without any facial protection, owing to the non-toxic qualities of the paint.

Among steel structures treated with the Pahl process may be mentioned bridges, tunnels, and underframes on the German State Railway; gasometers and containers at Berlin; and structural work, lock gates, &c., in Belgium. As representative of earlier work, the Berlin-Tempelhof bridge was hot-spray painted in 1928, and on being inspected recently by M. Bijls, Director of Roads and Bridges, Antwerp, was found to be in surprisingly good condition, although not having been re-painted since the original coat was applied.

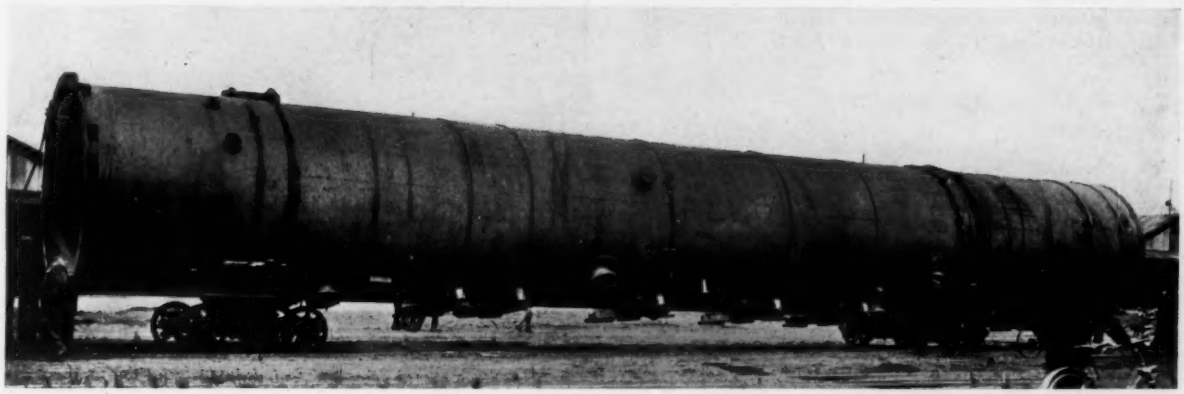
The jig-saw puzzle distributed to G.W.R. Goods Department staff as an incentive to care in handling (*see p.* 159 *last week*)

The new motor vessel entering the water

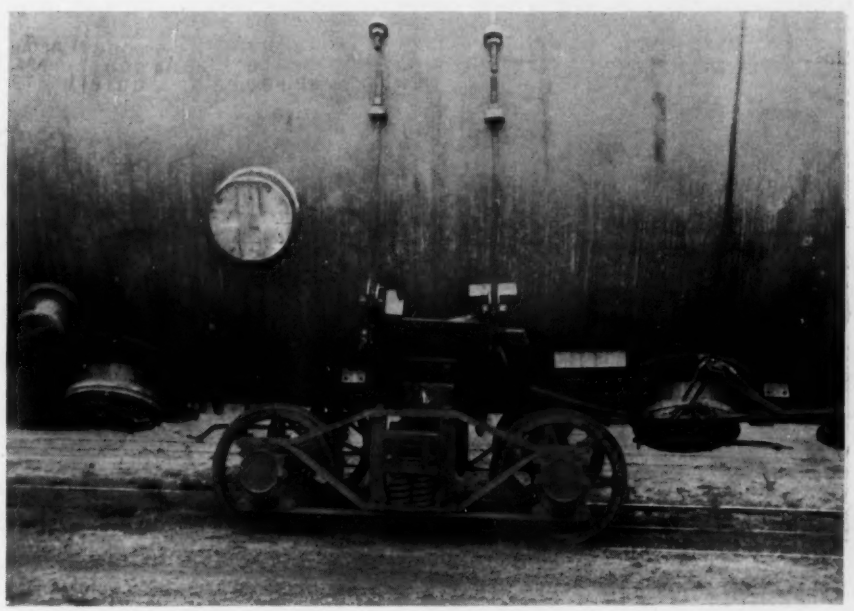
Mr. W. J. Elliott, General Manager of Pickfords Limited, holding the loving cup for Mrs. Elliott to take the first sip

LAUNCH OF THE "MOUNT"

(*See page* 232)



Above shows the cylinder mounted on bogie, and right, the trailer bogie in position



TRANSPORT OF HEAVY OIL CYLINDERS BY THE CENTRAL ARGENTINE RAILWAY

(*See page* 207)

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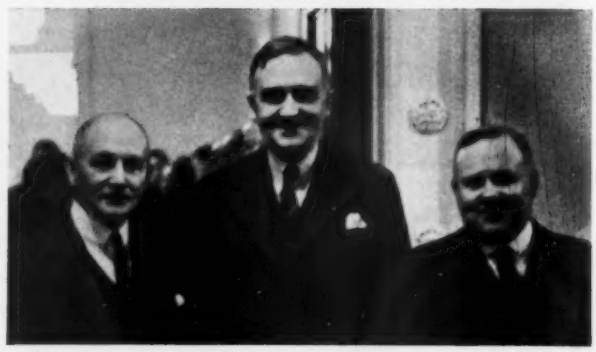
At the Permanent Way Institution dinner last Saturday: Above, from left to right, are Mr. Raymond Carpmael (Chief Engineer, G.W.R.), President, Lord Palmer (Deputy Chairman, G.W.R.), Lieut.-Colonel A. H. L. Mount (Chief Inspecting Officer of Railways, Ministry of Transport), and Mr. Cook (Chief Engineer, Roads, Ministry of Transport). On the right Mr. W. K. Wallace (Chief Civil Engineer, L.M.S.R.), the outgoing President, is seen between Mr. Carpmael and Mr. Fairburn (Deputy Chief Mechanical Engineer and Electrical Engineer, L.M.S.R.)

(*See page* 227)



Photos] *[W. M. Bond*

Photo] *[Rawood,*

A section of the G.W.R. Superintendent of the Line's staff dinner at which 275 were present (*see p.* 226)

RAILWAY NEWS SECTION

PERSONAL

Mr. Geoffrey H. Kitson, of Heron Court, Linton, near Wetherby, Yorkshire, has been appointed a Director of the L.N.E.R. in succession to the late Sir John H. B. Noble, whose death on January 8 was recorded in our issue of January 14.

Sir Murrough J. Wilson, Deputy Chairman of the L.N.E.R., was on January 26 elected President for 1938 of the Society of Yorkshiremen in London, and of the Yorkshire Society.

Sir Walter Nugent, Bart., was unanimously re-elected Chairman for 1938 of the Irish Railway Clearing House Committee, at the meeting held on January 26.

INSTITUTION OF LOCOMOTIVE ENGINEERS

The following elections and transfers were made at a meeting of the institution on January 26:—

Members

Mr. John Everard Barton, District Controller of Stores (Mechanical), Great Indian Peninsula Railway.

Mr. Henry Roy Coulson, Assistant Engineer (Class I), Department of Railways, New South Wales.

Transferred from Associate Member to Member

Mr. Henry Fowler, Assistant Works Superintendent, St. Rollox Loco. Works, Glasgow, L.M.S.R.

Associate Members

Mr. Aubrey John Hudson, Assistant Engineer (Mechanical), South African Railways & Harbours.

Mr. Edward Parsons Hubbard, Senior Draughtsman, English Electric Co. Ltd.

Transferred from Graduate to Associate Member

Mr. William Philip Warner, Assistant Manager, Towkok Tea Estate, Upper Assam.

INSTITUTION OF CIVIL ENGINEERS

Among the associate members of the institution transferred to the class of full Member on January 25 were the following:—

Mr. Edward Graham Clark, Secretary of the institution.

Mr. Alfred Proom Humble, Resident Engineer's Office, Singapore West wharf extension.

We greatly regret to record the death on January 27 of Mr. James McLaren, Secretary of the London & North Eastern Railway Company. Mr. McLaren, who was a qualified law agent, came to the L.N.E.R. from the former North British Railway, where much of his service had been spent in the Solicitor's Department. He became Chief of the Conveyancing Department in the Solicitor's Office of that company, prior to his appointment to succeed Mr. John Cathles as Secretary in July, 1918. On the formation of the London & North Eastern Railway, Mr. McLaren was appointed Joint Secretary of the new company with Mr. G. F. Thurston. He became Secretary when Mr. Thurston took over the duties of Chief Stores Superintendent in 1925. In 1936 Mr. McLaren was appointed Secretary of the Midland & Great Northern Railway Joint Committee, and the Norfolk & Suffolk Joint Railways Committee, when the L.N.E.R. assumed responsibility for these undertakings as from October 1 of that year. Mr. McLaren was a native of Kirriemuir, and the funeral took place there on January 31 (see page 225). All who had dealings with Mr. McLaren during his secretaryship of a great railway company had cause to appreciate his readiness with advice and assistance in the thick of his many responsibilities, and his death will be widely regretted. (See also page 197).

Harris' [*Picture Agency*

The late Mr. James McLaren

Secretary, North British Railway Company, 1918-22; Joint Secretary, London & North Eastern Railway Company, 1923-25, and Secretary, 1925-38

INDIAN RAILWAY STAFF CHANGES

Mr. V. O. Raynor has been confirmed provisionally as Deputy Chief Commercial Manager, N.W.R.

Mr. J. B. Remington has been appointed to officiate as Chief Transportation Superintendent, G.I.P.R., as from November 19 last.

Mr. G. C. Laughton, on return from leave, resumed duty as Senior Government Inspector of Railways, Bangalore, on December 4 last.

Mr. I. W. K. Smith, Chief Engineer, E.I.R., has been granted 21 months' leave preparatory to retirement, as from December 3 last.

Mr. H. Howe, Deputy Chief Engineer, E.I.R., has been granted 18 months' leave prior to retirement as from December 3 last.

Mr. C. G. W. Cordon, whose services were lent to the Railway Board, resumed his duties on December 27 as Chief Commercial Manager, M. & S.M.R.

Mr. T. Stephenson, on relief by Mr. Cordon, is officiating as Senior Deputy Agent, M. & S.M.R., while Mr. A. C. Rose is officiating as Junior Deputy Agent, M. & S.M.R.

Mr. E. L. Manley has been permanently promoted as Chief Engineer, State Railways, as from August 8 last; he continues to hold the position of Chief Engineer, Eastern Bengal Railway.

The Administrative Board of the Swiss Federal Railways has recommended to the Federal Council the appointments of Dipl.-Ing. Hans Etter as General Manager in succession to Dr. Anton Schrafl (who, as reported in our January 21 issue, is to become Manager of the Office International des Transports par Chemins de fer), and of Dr. Wilhelm Meile as new member of the management. Mr. Etter, who was born in 1874, has been on the management of the Federal Railways since 1926, after having been first on the staff of the Gotthard Railway, and afterwards in the Federal Railways as Deputy Chief Engineer, Chief Engineer, and Manager of the former 5th Division,

XUM

Herr Axel Magnus Granholm

General Manager, Swedish State Railways, 1914–37

Herr Gustaf Dahlbeck

Appointed General Manager, Swedish State Railways

successively. Dr. Meile is a National Councillor and has been Manager of the Basle Fair for the last 20 years. His age is 51.

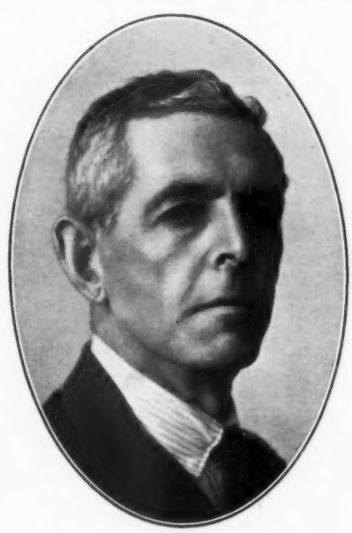
Herr Axel Magnus Granholm, who, as recorded in our issue of January 7, retired on December 31 from the post of General Manager, Swedish State Railways, was born at Smedjebacken in 1872. He graduated as Civil Engineer, highways and waterpower, from the Royal Technical Academy at Stockholm in 1894, and entered Government service in 1897 as Managing Engineer for railway construction and waterpower works. From 1914-37 Herr Granholm was President of the Royal Administration of the Swedish State Railways, and General Manager of the undertaking. Since 1904 he has been a Member and Chairman of several Royal Committees and commissions, and also holds the distinctions of Honorary Member of the Royal Swedish Institute for Engineering Research, 1932; Member of the Royal Military Science Academy, 1933; Member of the board of the Royal Technical Academy, 1933; Honorary Member of l'Institut Scientifique d'Etudes des Communications et des Transports, Paris, 1937.

Herr Gustaf Dahlbeck, who, as recorded in our issue of January 7 has been appointed General Manager of the Swedish State Railways, was born at Ostersund in 1883, and graduated as Civil Engineer at the Royal Technical University, Stockholm, in 1906. In the same year he entered the Highways Department. His railway career began in 1909, when he was engaged on construction of the Swedish Inland Line in Nordland, and in 1916 was in charge of widening works, having been appointed Permanent Way Engineer of the State Railways administration in 1915. In 1919 he was appointed Chief of Administration, Engineering Department. He

Miles] [*& Kaye*

The late Sir Charles Batho, Bart.

A Director of the L.N.E.R., 1932-38, and Lord Mayor of London, 1927-28



Mr. Barnard Humphrey

Motor Assistant to Superintendent of Road Transport, Great Western Railway, 1934-37

was appointed Manager of the Fifth District in 1927, and in 1932 went to Gothenburg as Manager of the Second District, the position he held up to his appointment to the general managership.

It is with great regret that we record the death on January 29 of Sir Charles Albert Batho, Bart., a Director of the L.N.E.R. Born in 1872, and educated at Highgate, he became a partner in Copland & Co., the City ship store and export merchants. Sir Charles had been a well-known public figure since his election as Lord Mayor of London in 1927-28. During his mayoralty, he instituted a relief fund to alleviate distress caused by unemployment in the coalfields. At the close of his term at the Mansion House, he received a baronetcy, and the unanimous thanks of the Livery for his "conspicuous services." His mayoralty was a year of many notable events, among them the inauguration on May 1 of non-stop running between King's Cross and Edinburgh by the L.N.E.R. Flying Scotsman, when Sir Charles, accompanied by Sir Ralph Wedgwood and Sir Nigel Gresley, inspected the locomotive and conversed with the enginemen before the train left London. He was appointed a Director of the L.N.E.R., as representing the Eastern Counties, in 1932, in succession to the Marquess of Londonderry. Sir Charles was a member of both the Southern Area and North Eastern Area local boards of the company, Chairman of the Hotels Committee (Southern and North Eastern Area), and a member of the Salaries, Traffic, and Stores Committees. He was also a Director of the East London Railway Joint Committee, the Sheffield & South Yorkshire Navigation Company, J. and I. Batten & Co. Ltd., and Faudels Limited. We comment editorially on his career on page 197.

The funeral at Golders Green Crematorium on Tuesday was private and there were no flowers by request. A memorial service to Sir Charles Batho was held at St. Andrew Undershaft, St. Mary Axe, yesterday. It was attended by many representatives of civic life and business interests.

The London & North Eastern Railway Company was represented by Mr. William Whitelaw, Chairman; Sir Murrough J. Wilson, Deputy Chairman; and other directors; Sir Ralph Wedgwood, Chief General Manager, and Lady Wedgwood; Mr. P. J. Dowsett, Assistant Secretary, also representing Sir Gerald F. Talbot, who is abroad; and other officers.

Mr. Barnard Humphrey, A.M.Inst.C.E., M.I.A.E., has retired from the position of Motor Assistant to the Superintendent of Road Transport, Great Western Railway, in which, as recorded in our issue of January 7, he has been succeeded by Mr. A. E. C. Dent. Mr. Humphrey served his apprenticeship with Kitson & Company at Leeds, and joined Great Western service as an improver at Swindon in September, 1899. He soon entered the drawing office and was later engaged on locomotive testing. In 1904 he was transferred to the Motorcar Department at Penzance. Mr. Humphrey was transferred to the Road Motor Department, Slough, in January, 1906, and was appointed Road Motorcar Assistant in January, 1912. In July, 1934, he was made Motor Assistant to Superintendent of Road Transport, which position he held until his retirement. Mr. Humphrey was joint author of a paper on "Springs," which won the Miller prize presented by the Institution of Civil Engineers.

Funeral of Mr. James McLaren

The funeral of Mr. McLaren took place at Kirriemuir, Scotland, last Monday. The coffin was conveyed by the 10.25 train from London on Sunday evening. On arrival at King's Cross station it was received by the Chairman, Chief General Manager, officers, and staff of the company, who then formed a cortège and followed the family mourners to the train. Those present included the following L.N.E.R. directors, officers, staff, and others:—

Mr. William Whitelaw, Chairman; Sir Charles C. Barrie, K.B.E., M.P., and Lt.-Col. The Hon. A. C. Murray, C.M.G., D.S.O., Directors; Sir Ralph L. Wedgwood, G.C.B., Chief General Manager; Messrs. P. J. Dowsett, Assistant Secretary; G. C. Ring, Registrar; H. S. Butterworth, Cashier (Southern Area); D. R. Edge, Assistant Mechanical Engineer; C. C. G. Dandridge, Advertising Manager; F. Goodricke, Assistant Advertising Manager; C. H. Newton, Divisional General Manager (Southern Area); R. J. M. Inglis, Engineer (Southern Area); J. C. L. Train, Assistant Engineer (Southern Area); V. M. Barrington-Ward, Superintendent, Western Section, Southern Area; H. W. J. Powell, Estate and Rating Surveyor (Southern Area); J. E. Ryan, Hotels Superintendent (Southern Area); R. R. Pettit, Chief of Police (Southern Area); F. Warriner, District Superintendent, King's Cross; G. F. Thurston, late Divisional General Manager (Southern Area); H. Ireland, Stationmaster, King's Cross; J. A. Kay, Editor, The Railway Gazette, D. R. Lamb, Editor, *Modern Transport*; Mr. & Mrs. J. A. Robbie (daughter and son-in-law) followed the coffin.

Mr. A. R. Lamb, Captain F. H. H. Thomas and all the members of the Secretary's staff at Marylebone, with many representatives of the Registration and Cash Offices.

Wreaths were sent from: The Chairman and directors; Secretary's staff at Marylebone, Liverpool Street, and King's Cross; Chief General Manager, Assistant General Manager and staff; Chief Accountant and staff; Divisional General Manager and Southern Area officers; Secretary of the Southern Railway and staff; officers of London Transport and former companies. Mr. and Mrs. Dowsett; Mr. and Mrs. J. E. Ryan and family; Mr. and Mrs. Thurston; and numbers of Mr. McLaren's personal friends.

The interment took place at Kirriemuir on January 31. The principal mourners were Mr. and Mrs. J. A. Robbie (son-in-law and daughter). Mr. Alex Watson represented the Secretary's Department, and the following Scottish Area officers and staff attended: Messrs. George Mills, Divisional General Manager; W. A. Fraser, Engineer; R. Gardiner, Superintendent (Southern Scottish Area); Geo. Begg, Passenger Manager (Southern Scottish Area); W. Philip, Divisional Accountant; J. Davidson, Cashier; J. Inglis, Locomotive Accountant; Messrs. Jas. H. Hunter, John Bain, and W. Greig, Solicitor's Office; Messrs. F. M. Robertson, Funds Secretary; James Bennett, Member of Superannuation Committee; and R. M. Crosbie, Cashier's Office.

Mr. B. C. L. Bean, O.B.E., V.D., has been appointed to officiate as Divisional Superintendent, Delhi, N.W.R.

Mr. Raymond Carpmael, Chief Engineer of the Great Western Railway, has been elected President of the Permanent Way Institution for the current year.

Mr. M. G. J. McHaffie, M.Inst.C.E., Docks Engineer, Southern Railway, has been elected Chairman of the newly-formed Portsmouth, Southampton, and District Association for corporate members and students of the Institution of Civil Engineers.

Presentations to Mr. William Bishop, formerly Chief Solicitor, Southern Railway

Mr. William Bishop, whose retirement from the position of Chief Solicitor of the Southern Railway Company was recorded in our issue of December 31, has been presented by the directors with a solid silver inkstand, suitably inscribed, and bearing the facsimile signatures of all the members of the board. He was also presented with a silver Georgian tray by the officers of the company, and the staff of his own department gave him a Georgian tea and coffee service.

We regret to record the death on January 29, at the age of 84, of Mr. Edwin Cottam, founder of the firm of Edwin Cottam & Co. Ltd., manufacturer of springs for railway carriages and wagons.

From *The London Gazette* of February 1: Territorial Army, Royal Engineers, Engineer and Railway Staff Corps: Lieut.-Col. A. R. Cooper, M.Inst.C.E., resigns his commission (February 2).

It is with regret that we record the death on January 16, at the age of 87, of Mr. W. H. Cobley, I.S.O., M.Inst.C.E., who from 1897 to 1908 was Superintending Engineer, Surveys and Construction, Natal Government Railways.

The death is announced in Madrid of Sr. Juan de la Cierva, who was Minister of Public Works in the Spanish Governments of 1927 and 1931. Sr. Cierva was the author in 1921 of a much discussed scheme for solving the railway problem in Spain. He held the portfolio of Public Works at the time of the advent of the Republic in 1931, when he was obliged to leave his country. He returned later, but since the outbreak of civil war he had been a refugee in a foreign legation in Madrid, where he died. His son, the well-known inventor of the auto-gyro, was killed in an air accident at Croydon last year.

XUM

G.W.R. Superintendent of the Line's Staff Dinner

Mr. F. R. Potter (Superintendent of the Line, G.W.R.) presided at the annual dinner and concert of his office staff on January 28, at the Chiltern Hall, Baker Street, N.W., when a record gathering of 275 members of the present and past staff and their guests attended. The principal guests included:—

Messrs. R. Carpmael (Chief Engineer), H. Adams-Clarke (Staff Assistant to General Manager), F. C. A. Coventry (Superintendent of Road Transport), C. T. Cox (Divisional Superintendent, Paddington), C. R. Dashwood (Assistant General Manager), F. R. E. Davis (Secretary), J. W. Enser (District Traffic Manager, Oswestry), H. T. Forth (Assistant Accountant), K. W. C. Grand (Assistant to General Manager), W. H. Jarvis (Stationery Superintendent), J. A. Kay (Editor, THE RAILWAY GAZETTE), F. W. Lampitt (Commercial Assistant to Chief Goods Manager), G. Matthews (Divisional Superintendent, Swansea), A. Maynard (Chief Goods Manager), F. H. D. Page (Signal and Telegraph Engineer), H. W. Payne (Principal Assistant to Chief Goods Manager), A. G. Pollard (Assistant to Chief Accountant), A. S. Quartermaine (Deputy Chief Engineer), R. A. P. Setterfield (Hotels and Refreshment Rooms Manager), G. Stephens (Chief of Police), H. Wheeler (Assistant to General Manager), and H. A. G. Worth (Assistant Advertising Manager, London Passenger Transport Board).

Mr. E. N. Godfrey (General Section) in proposing the toast of "The Great Western Railway" referred to the progress of the company in general terms, and in asking those present to support the toast referred to the wish that he was sure would be unanimous, namely, the continued and advancing prosperity of the Great Western Railway Company.

Mr. F. R. E. Davis (Secretary) replied in a witty speech and congratulated the Superintendent of the Line and his staff on the very excellent gathering at their annual dinner. He made special reference to the co-operation which existed, and had, as a matter of fact, always existed between the Traffic Department and other departments, an essential feature for the continued prosperity and progress for the future.

Mr. T. B. Harris (Chief Staff Clerk) proposed the combined toast of the "Retired Staff and Visitors." He said it would be invidious to make distinctions in view of the number of retired staff present, but expressed the pleasure of present members in welcoming so many of their late colleagues; the wish for long life and continued happiness was heartily extended to all. To the visitors Mr. Harris also extended a very hearty welcome.

Mr. Matthew Roberts on behalf of the retired staff, and Mr. F. H. D. Page, on behalf of the visitors, made suitable responses.

Mr. H. F. Hardy (Accident and New Works Section) in proposing the toast of the Chairman referred to the esteem in which Mr. Potter was held by the whole of his staff, and also to the ever-ready and sympathetic manner in which matters affecting his staff were dealt with by him. This toast was acclaimed amidst great enthusiasm with musical honours.

Mr. F. R. Potter, in response, took the opportunity of thanking the staff for their presence in such large numbers that evening and for their loyal and ready assistance to him at all times. Mr. Potter also specially welcomed his brother officers and thanked them for their co-operation with his department. He further intimated that he could not let the evening pass without making special reference to one member of the company present, namely, Mr. R. H. Nicholls (late Superintendent of the Line), and he was sure it was the wish of everyone to toast Mr. Nicholls and wish him continued good health and happy retirement. Further musical honours were accorded this toast, to which Mr. Nicholls suitably responded.

An excellent programme of entertainment was provided and the whole of the arrangements for the evening again proved an unqualified success.

Cover of menu card

Railway Rates in Argentina

The Chamber of Deputies has been sitting in "extraordinary sessions" for the express purpose of sanctioning the Budget Law of 1938, but extraneous matters are occasionally brought up, and the opportunity was taken by one of the Socialist Deputies to submit a resolution to the effect that the Chamber should inform the Executive Power that it would be gratified if no authority were given for any increase in railway tariffs. The motion was supported by representatives of other parties, and was immediately approved without one dissentient voice; not a single member being apparently interested in doing justice to the railways, or even drawing attention to omissions and errors made in the speech of the member who brought the matter forward. In commenting on the subject, the Argentine weekly journal, *The Review of the River Plate*, says: "It is noticeable that, however bitterly some of these political parties in the Argentine Congress may wage verbal warfare among themselves, they generally achieve unanimity when it is a case of 'downing' the British-owned railways."

It certainly has been very evident for some time past that the railways' "friends at court" are few and far between, despite the fact that the Leftists are not in power. What the effect of the resolution will be remains to be seen, but it seems improbable that the present Government will take any action favourable to the railways in the matter of rates in its last month of office. The new Government, which takes over the reins on February 20, is hardly likely to begin by dictating a measure which has been condemned by Congress and is distasteful to the man in the street; so that, weighing everything up, it looks as if the opportunity has vanished for the time being, especially as the crop situation is far less favourable than a year ago, and that several of the provinces are scourged by drought—points which, needless to say, were stressed in Congress.

Before Christmas the news agencies circulated a report that the Government was about to issue a decree raising railway rates for certain commodities and over certain distances, which would increase revenue by about five million pesos per annum, and there was much gratification in railway circles at the prospect, but nothing further came of it.

SERIOUS COLLISION NEAR ALLAHABAD (INDIA).—A fatal collision occurred at Bamrauli on the East Indian Railway, in dense fog about 5.28 on the morning of January 16, when 7 up express collided head-on with 212 down goods. Both drivers concerned, Burke and Thomas by name, and three other railwaymen, as well as three passengers, lost their lives, and fifteen others were injured. The Senior Government Inspector of Railways opened his enquiry at 1 p.m. the same day. Messages of sympathy were sent by the Member for Communications, Railway Board, the Governor, and the Premier of the United Provinces.

Permanent Way Institution Annual Dinner

Mr. R. Carpmael, Chief Engineer of the Great Western Railway, took the chair at the annual winter dinner of the Permanent Way Institution, of which he had just been elected President, on Saturday last. The function was held at the Charing Cross Hotel, London, and those present included:—

Messrs. C. G. Bainbridge, D. R. Bennett, K. Brinsmead, J. H. Condy, Major Cook; Messrs. F. R. E. Davis, R. E. Doré, W. S. Every, C. E. Fairburn, B. P. Fletcher, R. W. Gairns, R. Gaudin, R. Gurd, F. E. Harrison, W. Hepworth, H. Janes, J. F. Jones, J. A. Kay, Councillor H. Kirk; Messrs. F. Kerrigan, D. R. Lamb, F. Lawson, S. E. McLewin, J. W. Melville, J. Miller, Lt.-Col. A. H. L. Mount, Major R. F. Morkill; Mr. H. C. Muggeridge, Rt. Hon. Lord Palmer; Messrs. J. N. Peck, A. S. Quartermaine, J. Ratter, C. P. Sandberg, O. F. A. Sandberg, W. Y. Sandeman, T. H. Seaton, C. E. R. Sherrington, E. H. W. Tustain, A. E. Usherwood, W. K. Wallace, H. S. B. Whitley, W. A. Willox, J. B. Woodman.

Lord Palmer, Deputy-Chairman of the Great Western Railway, proposing the toast of "The Permanent Way Institution," said that he welcomed the opportunity of meeting so distinguished a gathering of men, whose work and experience were of such importance to the welfare of the British railways, and to the comfort and safety of the travelling public. In his capacity as Chairman of the Engineering Committee of the G.W.R. for the past 34 years, he had been enabled to keep in touch with matters pertaining to the permanent way and was able to appreciate the many and varied aspects of the work which fell under that heading. There could be no doubt that the institution, with its 2,400 members, carried on a most important work, and he had been particularly impressed with the democratic nature of its constitution, membership being open to all grades of the railway engineering staff, from chief engineers to lengthmen. It was interesting to learn that in recent years the institution had conducted examinations in permanent way subjects, diplomas being awarded to successful candidates; this was an excellent way in which to encourage a study of the problems of permanent way maintenance.

Mr. R. W. Gairns, District Engineer, Glasgow (L.M.S.R.), proposed the toast of "The President," and said that in reviewing the names of those who had held that office he had been struck by the number of eminent engineers among them, and in having Mr. Carpmael as President for 1938 they were fortunate in being able to carry on that tradition. Mr. Carpmael had rendered yeoman service to the institution ever since becoming a member, and had always played an active part in its work, particularly during his previous period of office as President in 1930, 1931, and 1932. Mr. Carpmael was a member of Council of the Institution of Civil Engineers, and a member of the Institution of Mechanical Engineers, and had read many important papers to these and other institutions. He had introduced classes in permanent way subjects on the Great Western Railway, and had been an enthusiastic supporter of the scheme inaugurated by the institution for the holding of examinations and granting of diplomas.

Mr. Carpmael, responding to the two previous toasts, said that Lord Palmer had shown himself to possess a great appreciation and human understanding of engineering difficulties, and his attendance as principal guest was very much appreciated. The responsibility for the maintenance of an efficient track was one which rested upon all grades of the permanent way staff, and the existence of the institution demonstrated the recognition of this complete interdependence of all grades. The permanent way staff had been shown in a paper recently presented to the institution to have a heritage dating back to very early days of history, and it was their job to maintain and enhance this heritage. But whilst recognising that their work was founded on tradition, care should be exercised to ensure that they did not become hidebound by tradition, and in this respect the institution, with its 2,400 members in 27 different countries, meeting together at their respective sectional meetings to hear and discuss papers, did a valuable work. A further benefit which arose from the sectional meetings was the fact that they enabled the engineering staffs of the various companies to meet together and interchange ideas on methods of working. Mr. Carpmael referred to the presence at the meeting held that afternoon of Mr. W. Hirst, a stalwart member of the institution who was now in his 90th year and who had occupied the office of President no less than 40 years ago. Meeting Mr. Hirst had served to remind him of the enormous changes which had taken place since the institution had been founded, changes which had certainly been of benefit to the railway companies.

Mr. H. S. B. Whitley, Divisional Engineer, Wolverhampton (G.W.R.), proposed the toast of "The Past President," and said that he was expressing the feelings of every member of the institution in saying how much they appreciated all that Mr. Wallace had done for them during his 18 years membership and particularly during the past three years in which he had occupied the presidency. It was said that if you wanted a thing done well, give to it the man of your acquaintance who had most work to do and he would find time to do it. The chief engineers of the four main-line railways were probably the busiest men in the country, and if mileage counted for anything, then Mr. Wallace was the busiest of them all. Yet he had found time to visit practically all the institution's sections situated in the United Kingdom, and in addition had led three most successful summer conventions. It was also noteworthy that 700 new members had been elected during Mr. Wallace's term of office.

Mr. Wallace, in response, said that if he had succeeded in fulfilling satisfactorily the duties of President, it was due largely to the assistance he had received from his personal staff on the L.M.S.R. and from the officers of the institution. On the question of speed, Mr. Wallace said that the permanent way men had met the demands made upon their skill, with the result that the running was generally as good today as it was when speeds of 20-25 m.p.h. slower obtained. He desired to thank all those who had contributed in any way to making his period of office such a happy one, and was confident that under Mr. Carpmael's guidance the institution would go from strength to strength.

Mr. F. E. Harrison, Engineer, North Eastern Area, L.N.E.R., proposed the toast of "The Guests," and made special mention of the ladies; Lord Palmer; Col. Mount, Chief Inspecting Officer for Railways, Ministry of Transport; Major Cook, Chief Engineer for Roads, Ministry of Transport; Mr. Fairburn, Chief Electrical Engineer, L.M.S.R.; and Mr. F. R. E. Davis, Secretary of the Great Western Railway, with whose name he coupled the toast.

Mr. F. R. E. Davis responded on behalf of the guests, and said that they felt honoured at being invited to come among the members of the engineering profession; he desired to extend grateful thanks for the hospitality which had been extended to them.

Mr. Henry Kirk proposed the toast of "Absent Friends," and the proceedings terminated with "Auld Lang Syne."

DERAILMENT ON AMERICAN CONCRETE TRACK.—On December 17 a passenger train was derailed on the experimental concrete track of the Pere Marquette Railway at Beech, 16 miles west of Detroit, causing injuries to 23 passengers. This section of concrete track was constructed some ten or twelve years ago and was described in *The Railway Engineer* of February, 1932. The cause of the derailment has not been published, but it is stated that a very severe storm of sleet occurred shortly before the train was due, and it is thought possible that water penetrated under the rail clips and froze, causing the rails to spread. According to our American contemporary, the *Railway Age*, a new track was constructed of standard materials on the top of the concrete roadbed in order that the service might be restored as quickly as possible.

XUM

L.M.S.R. Chief Operating Manager's Headquarters Office Annual Dinner

The annual dinner of the Chief Operating Manager's Headquarters staff at Euston was held at the Coventry Street Corner House on January 31, Mr. C. R. Byrom, Chief Operating Manager, presiding. Light music was provided during the dinner, and the toasts which followed were alternated with a number of excellent musical items which were very much enjoyed. The guests included:—

Sir Harold Hartley, Vice-President, and Messrs. A. F. Bound, Ashton Davies, A. Eddy, C. E. Fairburn, Captain J. W. Harris, Messrs. G. Morton, J. Shearman, W. A. Stanier, S. J. Symes, H. L. Thornhill, W. K. Wallace, J. A. Kay, and D. R. Lamb.

Mr. C. R. Byrom, in proposing the toast of "The L.M.S. Railway," said they were all very sorry that the President and Chairman of the company, Sir Josiah Stamp, could not be present this year. Everyone retained very happy recollections of his speech on the occasion of the previous dinner. He went on to say that it was also to be regretted that owing to an unforeseen call of some urgency at the last moment Mr. E. J. H. Lemon, Vice-President, was unable to attend, but they were fortunate in having with them Sir Harold Hartley, who would respond to the toast. Continuing, Mr. Byrom made reference to several members of his staff who had suffered long periods of illness during the year, and referred particularly to the very welcome return of Mr. S. H. Fisher, his Principal Assistant, who was absent on the occasion of the previous dinner. He said there could be no better evidence of the good feeling in the department and of the loyalty to him and his assistants than the large number of his staff who had come to the dinner, there being no less than 75 per cent. present.

Enumerating some of the outstanding features of the past year, he mentioned the heavy traffic, the Coronation, the introduction of the Coronation Scot, Midland Division accelerated passenger services, and numerous Royal Train journeys, which had entailed considerable extra work, whilst the special inquiries which were being conducted into many of the various activities of the department had proceeded without interruption. He took the opportunity of sincerely thanking all his assistants and staff, and also his divisional officers and their staff, for the efforts they had made to cope with the difficulties which had presented themselves, making particular reference to the abnormally bad weather encountered. At this point he mentioned that he would like to extend a hearty welcome to the divisional officers from Crewe, Derby, Manchester, and Glasgow, who were attending the dinner for the first time. He thanked all the chief officers for their unfailing assistance on all occasions.

As a department they stood ready to meet all the calls made upon them to the best of their ability, and they were determined to produce operating results which would show such an improvement as to increase the net revenue of the company; he concluded by saying, "Let our motto for 1938 be 'increased net revenue.'"

Sir Harold Hartley, replying to the toast of "The L.M.S. Railway," said that whilst it was a great pleasure to him to be called upon to speak at an Operating Department dinner, he regretted the circumstances under which this had been necessary. Sir Harold stated that he had been looking at the operating results from the year 1929 to date and he congratulated Mr. Byrom and his staff on the considerable improvements in operating efficiency which had been effected, which could be regarded as a great achievement. He stated that the future success of their great enterprise depended on all departments, a number of which were working in order that the operating department could achieve the desired result, and it was a great satisfaction to the departments who were supplying the facilities to see the good use which was being made of them. In conclusion, Sir Harold said they were engaged in a stiff fight, and success depended on everyone seeing that the utmost was done with the facilities available, and that every possible source of inefficiency and waste should be eliminated.

Mr. Ashton Davies, in responding to the toast of "The Guests," expressed their good wishes in the year which had just begun and hoped it would be a very successful one, and one of which Mr. Byrom and his staff would be proud. He remarked that there was no doubt that Mr. Byrom had performed a great service for the company, and it was fully appreciated that the department throughout the year did its job of work satisfactorily. He concluded a racy speech, interspersed with anecdotes, by thanking Mr. Byrom for the sumptuous feast and splendid entertainment.

Mr. F. O. Garratt, on behalf of the staff, proposed the toast of "The Chairman." He expressed the good feeling and loyalty of the staff towards Mr. Byrom and assured him that the co-operation which had obtained in the past would continue to be forthcoming in the future. He said that the ideal of the department was "On Time—Every Time."

Mr. Byrom, in acknowledging the toast, thanked them for the way in which they responded to the toast of his health and said that words could not express how much he valued the loyalty and co-operation of every member of his staff.

Southern Railway Servants' Orphanage

The "Sir Herbert Walker" Cot

On Saturday, January 29, a delegation of the Southern Railway clerical staff assembled at the Woking Orphanage for the endowment and dedication of a cot in the name of Sir Herbert Walker, K.C.B., as a token of esteem upon his retirement from the position of General Manager.

Mr. G. Cheal, Chairman of the Presentation Committee, spoke in highly appreciative terms of Sir Herbert's services as General Manager, and of the keen interest he had always shown in staff welfare. They had met that afternoon for the twofold purpose of perpetuating his memory by the endowment of a cot, and of presenting him and Lady Walker with personal gifts as a tangible indication of their affection. Mr. Cheal then handed to Mr. H. O'Neill, Chairman of the Board of Management, a cheque for £106 6s., subscribed by the Southern Railway clerical staff, and presented to Sir Herbert Walker a gold-mounted umbrella and also a note for Lady Walker (who was prevented by illness from attending) regarding her personal gift, which was a wireless set.

Mr. W. Stott, General Secretary, Railway Clerks' Association, welcomed the opportunity of associating himself with the gifts and good wishes of the Southern Railway staff, and paid a warm tribute to Sir Herbert Walker for his unequalled ability to go quickly from point to point, as befitted a railwayman, in meeting the wishes of railway workers. Sir Herbert possessed those three enviable qualities—brevity, clarity, and sincerity—and he invariably held the balance between differing and conflicting claimants—traders, travellers, shareholders, and staff. Mr. Stott also welcomed Mr. Gilbert S. Szlumper and wished the Southern Railway long and uninterrupted prosperity under his general managership.

Mr. H. O'Neill, in his reply, referred to the most keen and kindly interest taken in the orphanage by Sir Herbert and Lady Walker, and their readiness to assist in all cases of need. The object of the orphanage was to feed, clothe, educate, and maintain orphans of deceased employees, irrespective of the men's grades and whether they were subscribers or not. He stressed two special features—the future education of inmates, wherein the orphanage arranged for any boy or girl likely to benefit from secondary or technical education to be sent to the appropriate establishments, and the orphanage's welfare organisation, which made a special point of looking after boys and girls between the ages of 12 and 21.

Miss C. A. Reynolds, S.R.N., Matron of the institution, associated herself,

on behalf of the 177 children under her charge, with the previous speakers' remarks. She warmly thanked Sir Herbert Walker for the concessions and amenities they had enjoyed through his kind consideration.

Sir Herbert Walker thanked all the speakers for the kind things that they had said about him, and the staff for contributing so generously towards the testimonial and personal gifts for Lady Walker and himself. He was very pleased that the bulk of the staff's gesture went in the direction of benefiting an institution which stood by itself in railway circles and was looked up to with envy by other railway companies, and he wished the orphanage and its Board of Management every success. Some of the children in the orphanage had eventually joined the railway service, and others would, no doubt, do so in the future. He saw no reason why such work should not bring them happiness, citing the fact that his own railway service, extending over 52 years, had been entirely happy. The Southern Railway, he said, was in better circumstances than its constituents at the time of the amalgamation.

The party then assembled in one of the dormitories in the new wing where the tablet on the new cot was unveiled and a short service of dedication was conducted by the Chaplain of the institution. The proceedings terminated with an entertainment and gymnastic display by the children.

Staff and Labour Matters

Heavy Chemical Industries—Wages

The Joint Industrial Council for the Chemical Industry, which consists of representatives of the Association of Chemical Employers, the Transport and General Workers' Union, and the National Union of General and Municipal Workers, decided at a meeting in London on Tuesday, February 1, to increase the rates of pay of workers in the heavy chemical industry by ½d. an hour. The terms do not apply to Imperial Chemical Industries Limited, with which firm the unions made a separate agreement some weeks ago, as recorded in our issue of January 14.

Skilled Heating Engineers—Wages

An agreement under which increases in the rates of pay of heating engineers become payable was made at a meeting on February 1 between the National Association of Heating, Ventilating, and Domestic Engineering Employers, and the National Union of Operative Heating and Domestic Engineers and General Metal Workers. The new rates are 1s. 9½d. an hour for inner London, 1s. 9d. between twelve miles and fifteen miles radius from Charing Cross, 1s. 8½d. for cities with more than 500,000 population, and 1s. 8d. in all other districts.

Waterloo Station Staff Dinner, S.R.

Over 400 members of the Southern Railway staff and their guests attended the fifth annual Waterloo station staff dinner, which was held at Lyons' Corner House, Coventry Street, on Tuesday, February 1, under the Chairmanship of Mr. H. C. Greenfield, Stationmaster, Waterloo.

In proposing the toast of "The Directors and Chief Officers of the Southern Railway," Mr. A. Millard, of the Waterloo Station General Purposes Committee, referred to the increasing popularity and efficiency of railway travel in which the Southern Railway, with its accelerated electric and steam services, new rolling stock, and research work, had played a big part. It was a great pleasure to him to extend a welcome to Mr. J. E. Sharpe, London West Divisional Superintendent, and to associate his name with the toast of the company's directors and officers.

Mr. Sharpe, in his reply, thanked Mr. Millard sincerely for his tribute, and said it was true that the directors' policy had resulted in the Southern Railway's amazing development becoming the envy of other railways.

An outstanding example was the increase in electrification, so justifiably advocated and implemented by their late General Manager, Sir Herbert Walker. Staff co-operation was absolutely essential to achieve the best results, and he was especially proud of the Stationmaster's and Parcels Agent's staffs for the parts they had played.

The toast of "Our Guests," coupled with the names of Mr. R. B. Glassborow, Provident Mutual Life Assurance Association, and Mr. H. C. R. Calver, Stationmaster, Liverpool Street, was proposed by Mr. P. C. Bullen, Stationmaster's Office, Waterloo, who said it was difficult to single out any special guests, but they could rest assured that the Southern Railway extended a personal welcome to all.

Mr. Glassborow replied with a brief and appreciative speech, expressing the gratification he felt to have had connection with the railway companies for 37 years, and his pleasure at the goodwill which existed between them and the association he represented.

Mr. Calver complimented the Waterloo committee on the gathering, which had brought all sections of the staff together, and made for a thoroughly happy evening. It was true that the Southern Railway occupied the proud position of pioneers in electrification, but the L.N.E.R. was embarking on a comprehensive electrification scheme, which he trusted would be the forerunner of a closer and greater alliance between the companies.

The toast of "The Chairman" was briefly proposed by Mr. G. E. Barlow, Traffic Inspector, Waterloo, who said that on no occasion before had they had the pleasure of welcoming so many representatives from other companies. He paid high tribute to Mr. Greenfield, and alluded particularly to the efficient manner in which he had conducted a very difficult task, aggravated in 1937 by record summer services and by exceptionally heavy traffic in connection with the Coronation and Naval Review.

Mr. Greenfield, replying, said he was proud of Waterloo and all that it stood for, and he heartily acknowledged the loyalty and support of his staff, without which it would not have been possible to carry out the onerous duties resulting from the exceptionally heavy traffic in 1937.

In the course of the evening J. Lyons' Symphony Orchestra provided an excellent musical programme, and several singers and entertainers helped to make things go with a swing.

Eastern Divisional Engineer's Staff Dinner, S.R.

The fourth annual dinner of the Eastern Divisional Engineer's staff, Southern Railway, took place at Ashford on February 2, with Mr. H. E. Robarts, Divisional Engineer, in the chair. Among those present were :—

Messrs. A. E. Brounger, G. Cheale, J. T. Cloke, R. N. Cloke, S. W. J. Denness, C. V. Hill, J. Latham, W. A. Messer, P. Nunn, E. A. Rampton, W. Redding, E. A. Richards, H. V. Russ, D. Sheppy, A. E. Usherwood, W. A. Willox, F. J. Wymer, and G. Wynne-Davies.

Mr. Brounger, in proposing the toast of "The Chairman," referred to the successful surmounting of difficulties under his guidance to which must be attributed, at least in some measure, the credit of the improving margin of receipts over expenditure, making possible the restoration of cuts in pay.

Mr. Robarts, in response, took the opportunity to thank his staff for the loyal co-operation which had made the work of their division possible. He mentioned the heavy programme of work that lay before them in order that the railway might successfully cope with the ever-increasing demands of the Traffic Department. Electrification extensions and new stations were new responsibilities they had to shoulder, in addition to those of ordinary maintenance. Concluding, Mr. Robarts contrasted present conditions with those described in a railway book of 1852, in which the punctilious consideration of the Traffic Department for the Engineer's was noticeable. In those days, permanent way inspectors were referred to as overlookers, and gangers as squinters, terms which, particularly the latter, were perhaps more directly appropriate than the present names. It was, of course, important, Mr. Robarts concluded, that the squint should be a straight one.

Mr. R. N. Cloke proposed the toast of "The Guests" and paid a tribute to the co-operation of the other departments who were represented among them. Mr. W. A. Willox and Mr. G. Wynne-Davies briefly responded.

XUM

Current Engineering Practice and Experiments on the L.M.S.R.

On Saturday, January 29, Mr. W. K. Wallace, the outgoing President of the Permanent Way Institution, delivered to the members at their annual winter meeting an address which he introduced by saying that he proposed to follow the example of his predecessor in giving some notes on the work in hand by the company of which he was Chief Civil Engineer.

Flat-Bottom Track

Arguments as to the relative advantages of bull-head and flat-bottom rails for use on British railways had, said Mr. Wallace, continued for many years and had been inconclusive, one reason being that there was no experience in Great Britain of the use of flat-bottom road on main lines. He had experience in maintaining such track in Ireland, but generally speaking not on first class lines. Whereas Great Britain was the great protagonist of bull-head road, most of the other railways in the world used flat-bottom exclusively. When he was in the United States in 1933, Mr. Wallace was much struck with the good condition of the permanent way after two or three years of extremely limited attention and expenditure. Consequently it was decided to make a trial on the main lines of the L.M.S.R. of various designs of flat-bottom road, and in 1936-37 five miles were laid using British standard 110-lb. flat-bottom rail which gave a head approximately equal in area to the 95-lb. bull-head rail. Various types of fastening were used (these were fully described and illustrated in THE RAILWAY GAZETTE of May 14, 1937). The test lengths were laid at different times, and up to the end of 1937 had been in service for periods varying from 33 to 65 weeks, insufficient yet for any conclusive results to be shown. A special return, said Mr. Wallace, was made weekly of the man-hours spent on various classes of work, *e.g.*, packing, lining, adjusting fastenings, &c., and in each case this included time on an adjoining length of R.B.S. bull-head track put in at or about the same time.

Some of the rails were laid with 29 sleepers to the length as against the standard 24, and it was interesting that in the case of the German design of fastening the additional sleepers seemed to have reduced the man-hours required in maintenance, particularly in packing. In the case of the American type of fastening the figures were about equal. It should be noted that the essential difference between the two types of fastening were that, whereas the German provided wholly independent fastenings between rail and soleplate, and soleplate and sleeper, the fastening of the rail to the soleplate in the American was also part of that from the soleplate to the sleeper.

Other Developments

Mr. Wallace described by means of an extremely effective film, taken by the company's Publicity Department, the method now being rapidly extended throughout the L.M.S.R. of measured shovel packing (see THE RAILWAY GAZETTE of June 9, 1937). The company was bringing the system into operation as rapidly as sets of apparatus were delivered and men trained in their use. Although, said Mr. Wallace, there was difference of opinion as to its advantages over the method of shovel packing heretofore in use, it had been received very favourably. There was no doubt that it was a slower job, but his experience had been that road put up by measured shovel packing lasted at least 50 per cent. longer before requiring attention than road attended to by the old method.

Mr. Wallace referred to the description of two-level chairs and transitioned turnouts in articles published in THE RAILWAY GAZETTE of October 2 and 9, 1936, by Mr. W. M. Bond. The company was continuing the use of two-level chairs, which were proving a valuable facility in decreasing the severity of slacks imposed on traffic at junctions, which with the modern demand for high-speed trains were much more serious hindrances to time-keeping than with slower trains.

The building up of worn crossings under traffic by welding was now standard practice, and the L.M.S.R. was now operating 23 electric generating sets which had welded 4,028 crossings last year and a total of 17,800. Recently oxy-acetylene welding had been adopted, and last year 879 crossings were done, making a total of a little over 1,000. Lately it had been the practice to keep the V level with the wing rails and build up the wing above normal rail level. By this method the axle path instead of being depressed with the ordinary construction having a dipped V was kept level by the hump wing.

Conductor rail bonds were now welded on the foot of the rail and the running rail for the negative traction return current on electrified sections was also welded. Welded bonds made a much neater job than the old pin jointed design, and simplified the installation of crossing work. The whole of the new electrification of the Wirral lines had been carried out with oxy-acetylene welded bonds, as had also the track of the Liverpool and Southport line from which the fourth rail had been removed at the same time.

With the extended use of Douglas fir sleepers the company had installed an incising machine at its Ditton depot in 1935 to improve the impregnation of these sleepers when creosoted. The creosote temperature as a rule was about 140° F., and the pressure up to 200 lb. per sq. in. The approximate time for creosoting a charge was three hours. For unincised timber, about 1·2 gal. per sleeper was injected, say 0·4 gallons per cu. ft., while for incised timber 1·9 gall. per sleeper, or 0·64 gallon per cu. ft., an increase of approximately 50 per cent.

Mr. Wallace concluded by describing the renewal of a bridge crossing the River Nene at Northampton with precast reinforced concrete girders.

Oakley Junction Accident

Inquiry Continued in Private

Lieut.-Colonel E. Woodhouse opened his inquiry on January 27 at Bedford into the accident at Oakley junction, L.M.S.R., on January 21, when the 2.10 p.m. express, St. Pancras to Bradford, collided with an empty carriage train. Another death has taken place in hospital, bringing the total to 3, with some 20 injured.

Mr. R. P. Humphrys, Solicitor, represented the London Midland & Scottish Railway Company; Mr. J. V. Sweeney, Organising Secretary, was for the Associated Society of Locomotive Engineers and Firemen; Mr. F. N. A. Humphreys represented the National Union of Railwaymen; Mr. J. Barrow was for the Railway Clerks' Association; and Mr. Seaton Taylor, Solicitor, appeared for Mr. A. Brown, one of the passengers.

Colonel Woodhouse, on behalf of the Minister of Transport, expressed sympathy with the relatives of those killed or injured. He understood that as a result of the work of local residents some injured were taken away even before the ambulances arrived.

He thought that there was a little misconception as to what occurred. Some accounts at first said that the express train jumped the points and that the collision occurred at a very high rate of speed. He gathered that neither of those statements was correct, and it was well that the proper story should be given.

Colonel H. Rudgard, Divisional Superintendent, said that at Oakley Junction signals were at danger, a train of empty coaches having been propelled by an engine from the up-line to the down Northampton line preparatory to being disposed of in a siding. The 2.10 p.m. passenger train failed to come to a standstill at Oakley Junction, where the points were set for the Northampton line.

The passenger train travelled on to this line, and came into collision with the engine and coaches standing there, the speed at the time of the collision

being about 25 m.p.h. There was no derailment of the engine and coaches until after the collision.

The passengers behaved very calmly, and those not injured gave every assistance to their fellows. The staff on the train and railway staff in the vicinity rendered immediate assistance. Members of the public arrived in cars, and the injured were very speedily removed to hospital in these cars and in police cars. Doctors were almost immediately on the scene. There was one doctor and his wife on the train. The doctor was injured, but his wife rendered assistance. The driver of the stationary engine was on the ground alongside it.

Evidence was given by the guard of the express, F. Scoffield, who noticed a brake application at Bromham; by the signalman there, F. Neal; and two of the dining car staff, R. Easton and R. Yeomans; and at the mid-day adjournment Colonel Woodhouse announced that subsequent witnesses would be heard in private.

At the inquest held at Sharnbrook on February 1 by the Coroner, Mr. Whyley, on the bodies of the three persons killed as a result of the collision, A. W. Jones, C. R. Allensby, and H. A. Grange, a verdict of accidental death was returned.

H. J. Hudson, driver of the express, said the Oakley Junction distant and home signals were on, but he found he was unable to pull up in time and so was diverted to the Northampton line; speed was reduced to 25 or 20 m.p.h. by the time the engines collided. J. Finnity, signalman at the Junction box, said he diverted the empty train to the branch to wait for the express to pass. He accepted the latter but could not change the road as the empty train engine was foul of some points. He sent to the driver to tell him to move and later pulled the detonator placer lever. Steam obscured his view of the train on the branch. The guard of the empty train also gave evidence.

The Coroner, addressing the jury, said he thought there was no culpable negligence on the signalman's part; possibly there was an error of judgment and keenness in desiring to deal quickly with the traffic.

British and Irish Traffic Returns

GREAT BRITAIN	Totals for 4th Week			Totals to Date		
	1938	1937	Inc. or Dec.	1938	1937	Inc. or Dec.
L.M.S.R. (6,856 mls.)	£	£	£	£	£	£
Passenger-train traffic...	376,000	367,000	+ 9,000	1,521,000	1,457,000	+ 64,000
Merchandise, &c. ...	468,000	465,000	+ 3,000	1,889,000	1,860,000	+ 29,000
Coal and coke ...	307,000	286,000	+ 21,000	1,245,000	1,121,000	+ 124,000
Goods-train traffic ...	775,000	751,000	+ 24,000	3,134,000	2,981,000	+ 153,000
Total receipts	1,151,000	1,118,000	+ 33,000	4,655,000	4,438,000	+ 217,000
L.N.E.R. (6,315 mls.)						
Passenger-train traffic	251,000	246,000	+ 5,000	1,024,000	986,000	+ 38,000
Merchandise, &c. ...	338,000	333,000	+ 5,000	1,299,000	1,288,000	+ 11,000
Coal and coke ...	283,000	264,000	+ 19,000	1,132,000	1,038,000	+ 94,000
Goods-train traffic ...	621,000	597,000	+ 24,000	2,431,000	2,326,000	+ 105,000
Total receipts	872,000	843,000	+ 29,000	3,455,000	3,312,000	+ 143,000
G.W.R. (3,737 mls.)						
Passenger-train traffic...	153,000	150,000	+ 3,000	641,000	636,000	+ 5,000
Merchandise, &c. ...	193,000	185,000	+ 8,000	774,000	734,000	+ 40,000
Coal and coke ...	127,000	117,000	+ 10,000	509,000	473,000	+ 36,000
Goods-train traffic ...	320,000	302,000	+ 18,000	1,283,000	1,207,000	+ 76,000
Total receipts	473,000	452,000	+ 21,000	1,924,000	1,843,000	+ 81,000
S.R. (2,147 mls.)						
Passenger-train traffic...	255,000	250,000	+ 5,000	1,038,000	1,004,000	+ 34,000
Merchandise, &c. ...	62,000	63,500	− 1,500	227,500	231,000	− 3,500
Coal and coke ...	41,000	42,500	− 1,500	150,500	145,000	+ 5,500
Goods-train traffic ...	103,000	106,000	− 3,000	378,000	376,000	+ 2,000
Total receipts	358,000	356,000	+ 2,000	1,416,000	1,380,000	+ 36,000
Liverpool Overhead ... (6½ mls.)	1,335	1,191	+ 144	5,588	4,857	+ 731
Mersey (4½ mls.) ...	4,231	4,024	+ 207	18,001	17,284	+ 717
*London Passenger Transport Board ...	559,700	533,100	+ 26,600	17,417,500	17,333,300	+ 84,200
IRELAND						
Belfast & C.D. pass. (80 mls.)	1,738	1,647	+ 91	6,960	6,548	+ 412
,, ,, goods	506	514	− 8	1,660	1,742	− 82
,, ,, total	2,244	2,161	+ 83	8,620	8,290	+ 330
Great Northern pass. (543 mls.)	7,500	6,750	+ 750	31,800	28,950	+ 2,850
,, ,, goods	8,500	9,000	− 500	31,550	33,650	− 2,100
,, ,, total	16,000	15,750	+ 250	63,350	62,600	+ 750
Great Southern pass. (2,076 mls.)	25,987	23,766	+ 2,221	110,614	104,139	+ 6,475
,, ,, goods	37,256	38,791	− 1,535	171,216	176,519	− 5,303
,, ,, total	63,243	62,557	+ 686	281,830	280,658	+ 1,172

* 31st week (before pooling)

British and Irish Railway Stocks and Shares

Stocks	Highest 1937	Lowest 1937	Prices Feb. 2, 1938	Prices Rise/Fall
G.W.R.				
Cons. Ord. ...	67⅝	55¾	63¾	+¾
5% Con. Prefce. ...	127	108	117½	—
5% Red.Pref.(1950)	113	109	110½	—
4% Deb.	113⅝	102½	109½	—
4½% Deb.... ...	118	106	110½	—
4½% Deb.	124½	112	117½	—
5% Deb.	136½	122¾	129½	—
2½% Deb.... ...	76	64	68½	—
5% Rt. Charge ...	133 7/16	118	126½	−½
5% Cons. Guar. ...	133¾	116½	127	—
L.M.S.R.				
Ord.	36⅛	25⅜	27½	−¾
4% Prefce. (1923)	82½	65¾	68	—
4% Prefce. ...	92½	77¾	80	+½
5% Red.Pref.(1955)	107¾	102	103	—
4% Deb.	108	99¼	103½	−1
5% Red.Deb.(1952)	117½	111	113½	—
4% Guar. ...	104	95⅞	102	—
L.N.E.R.				
5% Pref. Ord. ...	12½	6¾	7¾	−¼
Def. Ord.	6¼	3⅝	3⅞	−⅛
4% First Prefce.	79½	63	65½	—
4% Second Prefce.	31½	21	25	−½
5% Red.Pref.(1955)	101¼	89¾	96½	—
4% First Guar. ...	103	91⅞	95½*	—
4% Second Guar.	97⅝	85½	89*	—
3% Deb.	84⅛	74	77½	−1
4% Deb.	107¼	98½	102½	−1
5% Red.Deb.(1947)	113½	106½	110½	—
4½% Sinking Fund Red. Deb.	110 3/16	105½	107	—
SOUTHERN				
Pref. Ord.... ...	98⅝	83½	84	—
Def. Ord.	27⅞	16¾	20½	+1
5% Pref.	126 11/16	105 13/16	114½	—
5% Red.Pref.(1964)	118	110¼	113½	—
5% Guar. Prefce.	133¾	116¾	127	—
5% Red.Guar.Pref. (1957)	118½	111½	115	—
4% Deb.	112	101¼	107½	−½
5% Deb.	135¾	123½	127½	—
4% Red. Deb. 1962–67	113	105	106½	—
BELFAST & C.D.				
Ord.	5	4	4½	—
FORTH BRIDGE				
4% Deb.	106	99½	100½	—
4% Guar. ...	105¾	99	100½	—
G. NORTHERN (IRELAND)				
Ord.	11	5	5	−½
G. SOUTHERN (IRELAND)				
Ord.	50	21½	24	+1¼
Prefce.	61	34	33½	+½
Guar.	94¾	69½	70¼	+3¼
Deb.	95	82⅛	82¾	—
L.P.T.B.				
4½% "A" ...	123¾	110½	118½	—
5% "A" ...	135	121½	128½	—
4½% "T.F.A." ...	108¾	104	106	—
5% "B" ...	125	114½	121½	+1
"C"	99¾	75	80½	+½
MERSEY				
Ord.	42⅜	22	22	+1½
4% Perp. Deb. ...	103	96¾	100*	—
3% Perp. Deb. ...	77⅜	74½	74½*	—
3% Perp. Prefce.	68¾	61¼	65½	—

* ex dividend

XUM

NOTES AND NEWS

L.N.E.R. Northern Belle Cruising Train.—The L.N.E.R. will again this year run three train cruises to Scotland by the Northern Belle, leaving King's Cross on the evenings of June 3, 17, and 24 for a week's itinerary. The train has accommodation for 60 passengers, who will enjoy special facilities for visiting the Empire Exhibition at Glasgow.

Faster L.N.E.R. Service from the Continent.—From February 1 the nightly steamship service from Antwerp to Harwich (Parkeston Quay) has been accelerated by approximately one hour. Passengers now leave Antwerp at 7.45 p.m. (instead of 6.50) and arrive in London (Liverpool Street station) at 7.53 a.m. as heretofore. There are corresponding accelerations from Brussels (53 min.), Cologne (2 hr. 21 min.), and other Continental stations.

Annual General Meetings, British Main-Line Railways.—The annual general meetings of the four main-line railways will be held as follow: G.W.R., February 23, 11.30 a.m. at the General Meeting Room No. 1 platform, Paddington station; Southern Railway, February 24, 11.30 a.m. at Southern House, Cannon Street station; L.N.E.R., March 4, 2 p.m. at the Wharncliffe Rooms, Hotel Great Central, Marylebone station; L.M.S.R., March 10, 11.30 a.m. at the Friends' Meeting House, Euston Road.

Wirral Electrification. — The L.M.S.R. has announced that a full electric service over the Wirral lines will begin on Monday, March 14. A partial electric service will be run on the previous day to afford the staff an opportunity of becoming acquainted with the altered methods of operation. Through electric trains will be run from Liverpool to West Kirby and New Brighton. The L.M.S.R. steam passenger service between West Kirby and Seacombe will be withdrawn after March 12, but the L.N.E.R. service will be continued.

Motor Vessel Launched at Greenwich.—A motor vessel designed to facilitate furniture removal work was launched at Point Wharf, Humphery & Grey's shipyard, Greenwich, on Tuesday last. The *Mount* was ordered by Pickfords Limited on behalf of its subsidiary, Crouchers Limited, to augment that company's existing fleet of 25 boats serving between the Isle of Wight and the mainland. The launching ceremony was performed by Mrs. W. J. Elliott, wife of the general manager of Pickfords Limited (see illustration on page 221). The vessel, which has an overall length of 80 ft. and a beam of 19 ft., was especially designed to provide for the loading of eight standard containers used in the transport of furniture, meat, &c., and to facilitate, in conjunction with the big cranes situated at Cowes, Newport, Southampton, and Portsmouth, their through transit to and from the Island. Two A.E.C. marine diesel engines will give the vessel a speed of 7 knots.

Replacement of Niagara Falls View Bridge.—The Niagara Falls View bridge, which was destroyed by the jamming of ice in the gorge below the falls last week, was owned by the International Railway Company, though it carried no rail traffic. Latest messages from America indicate that the company has decided to replace the bridge by a new one on the same site.

Gale Affects Cross-Channel Services.—The strong gale last week end affected certain of the Southern Railway Company's cross-channel services, and the effect of the bad weather occasioned some delays. The force of the gale was especially felt on the Newhaven-Dieppe route and on Sunday, January 30, the day service between these two ports was cancelled in each direction. It is but seldom that the service on this route fails to be maintained.

Cosford Aerodrome and Malswick Halts Opened.—The G.W.R. opened Cosford Aerodrome and Malswick halts on January 31 and February 1, respectively. The former, situated between Albrington and Shifnal on the Wolverhampton-Wellington line, serves the personnel of the aerodrome, which is now under construction. Malswick halt, between Newent and Barber's Bridge stations, on the Gloucester-Ledbury line, serves the hamlets of Okle Green, Kent's Green, Malswick, Okle Clifford, and Upleadon.

L.N.E.R Air Raid Precautions Demonstration.—Employees of the L.N.E.R. North Eastern Area, who, under the direction of Lieut.-Col. H. S. Cole, Chief of Police of the Area, are receiving training in anti-gas and air raid precautions, gave a demonstration of their work at York, on February 1 Lieut.-Col. Cole, who is in charge of air raid precautions for the North Eastern and Scottish Areas, explained that the company had set up 20 main training centres, at each of which from 320 to 350 men received instruction weekly.

The Cordoba Central Agreement.—The Cordoba Central Railway Co. Ltd. announces that an agreement has been entered into with the Argentine State lines, under which the latter take over from February 1, 1938, the operation of the company's railway for a maximum period of four years, determinable if in the meantime Congress sanctions the purchase of the railway by the State, and the holders of the various classes of the company's stocks ratify the sale. The relative purchase/sale agreement, which is *ad referendum* to Congress and the company's stockholders, and embodies the terms already made public, has also been executed. The consideration payable to the company under the working agreement is £380,000 per annum, payable by monthly instalments in sterling in London. If, however, Congress shall not have given its consent to the purchase of the company's railway within the period of four years, the amount payable for the fourth year will be a sum equivalent to the net earnings of the railway for the twelve months ended June 30, 1937. The company will bear certain expenses, including the cost of renewals up to an amount not to exceed $700,000 paper (say £43,750) per annum, and that of maintaining for the time being the organisation necessary to deal with the settlement of accounts.

Questions in Parliament

Fencing Southern Railway Lines

Brig.-Gen. Clifton Brown asked the Minister of Transport on February 2 whether he would arrange with the Southern Railway Company that no extension of electrification would take place in rural areas before the undertaking the company had given him as to fencing and protection had been implemented.

Dr. Leslie Burgin: The Southern Railway Company informs me that its programme of works for 1938 provides for the erection of over 50 miles of the improved types of fencing. This covers all places where trespassing has been reported as being prevalent or likely to occur, both in the areas already electrified and in those in process of being electrified.

A.T.C. on the G.W.R.

Mr. Maxton asked the Minister of Transport on February 2 if he would make inquiries regarding the use of a device on the Great Western Railway which prevented a train passing a signal at danger, and urge or compel installation on other railways.

Dr. Leslie Burgin: I am fully informed about the system of automatic train control which is installed throughout the greater part of the running lines of the Great Western Railway and operates in connection with the distant signal. Trials have been in progress for some time on the L.M.S.R. with an alternative system which performs similar functions. This company and the L.N.E.R. and Southern Railway companies have felt it necessary to await the outcome of these experiments before adopting either system. While I have no power to compel the use of automatic train control equipment, I am anxious to encourage its wider use with due regard to the reliability of the apparatus.

Mr. Maxton: Is it not a fact already that the L.M.S.R., L.N.E.R., and the Southern Railway have a much worse accident record than the Great Western?

Dr. Burgin: I would not like to express an opinion on the relative accident levels without the question being put on the paper.

RAILWAY AND OTHER REPORTS

Metropolitan Railway Surplus Lands Co. Ltd.—The board has decided to recommend a dividend of 2¼ per cent. for the half year ended December 31, making 3⅜ per cent. for the year, and to transfer £2,000 to reserve and carry forward £2,519 to next year.

Mersey Railway Company.—The directors, at their meeting on January 28, resolved to pay the full dividend of 3 per cent. on the perpetual preference stock and to recommend a payment of a dividend of ⅞ per cent. on the ordinary stock. The dividend on the ordinary stock for 1936 was ¾ per cent.

Panama Railroad Company.—Total operating revenue for the year ended June 30, 1937, amounted to $1,609,744, compared with $1,456,165 in the previous year. Working expenses were $1,333,404 against $1,250,765, leaving net operating revenue at $276,340, against $205,399. Operating ratio was 82·83 per cent., compared with 85·90 per cent., and 207,452 train-miles were run. Average mileage operated remained the same, at 47·61. Passengers carried numbered 355,761 against 339,444 in the previous year; and 155,832 tons of freight compared with 161,134 in 1936. Gross coaching revenue was $580,470, and gross freight revenue $872,727, comparing with $533,247 and $803,095 in 1936.

Shabani Railway.—The report for the year ended September 30, 1937, showed gross earnings of £79,320 against £68,293 in the previous period. Working expenses (including provision for depreciation) were £22,088, against £21,782, leaving net revenue £57,232 against £46,511. After providing for payment of £24,142 to the Rhodesian and General Asbestos Corporation, in reduction of previous advances under their guarantee, and after providing £16,332 for interest on advances against 6½ per cent. debentures, £4,973 for income tax, £6,168 for sinking fund for redemption of advances against 6½ per cent. debentures, and other expenses, the credit balance remaining was £6,250, and adding £3,141 brought forward made £9,391, out of which the directors recommend payment of a dividend of 12½ per cent. less tax.

Salvador Railway.—The accounts for the year ended June 30, 1937, show a profit of £13,273, against a loss in 1936 of £3,293. After crediting miscellaneous receipts and charging loss on exchange, trustees' remuneration, &c., there is a net credit balance on the year of £11,535, which goes to reduce debit balance forward to £74,801, to which has to be added £1,112 for special expenditure on hurricane damage. The General Manager reports number of passengers is up by 22 per cent., and total tonnage moved increased by no less than 59·72 per cent., although working expenses were only 0·93 per cent. higher. Unfortunately, the increased number of passengers was accompanied by a reduction in receipts, owing to cutting of rates by buses. It is difficult to see how road competition can be more acute as pirates even now are carrying at the equivalent of only one-tenth of a penny a ton mile.

Dover Transport.—The financial results of the bus services maintained for Dover Corporation by the East Kent Road Car Co. Ltd. during the period from January 1, 1937, to September 30 last, show receipts of the undertaking in the Dover area amounting to £29,072, with a net profit of £1,403. When the accounts were presented to the Dover Transport Committee on January 3, Councillor Pudney said that, if the committee had begun to work its own buses when the trams were abandoned, there would not have been the same services and facilities as had resulted from the arrangement with the East Kent Road Car Co. Ltd.

Thos. Cook & Son (Bankers) Ltd.—This subsidiary of the well-known travel organisation has been responsible since its formation in 1924 for the banking business of the firm. As a private concern no profit and loss account is published. For the year ended October 31, 1937, current and other liabilities were £4,469,910 compared with £4,016,800 in the previous period, but were covered to the extent of approximately 83 per cent. by cash and short-term loans. Investments are shown as £641,026, mainly represented by British Government securities. The published reserve of £125,000 is equal to the paid-up capital, apart from substantial reserves. The business of Thos. Cook & Son is now approaching its centenary.

Bombay Port Trust.—The port of Bombay shared in the world wide recovery from trade depression, as evidenced in the results for the year ended March 31, 1937. The year's working showed a surplus of Rs. 14.74 lakhs on General Account, as compared with a surplus of Rs. 2.26 lakhs in the previous period. This satisfactory result was achieved both by an increased revenue and a substantial reduction in expenditure. Actual receipts were Rs. 247.53 lakhs as compared with Rs. 242.93 in 1935-36. Working expenditure was Rs. 122.33 lakhs against Rs. 121.59 and debt charges Rs. 110.18 lakhs against Rs. 118.15 lakhs, percentage of working expenses to receipts being 49.42.

Westinghouse Brake and Signal Company.—Net profit for the year to September 30, 1937, was £275,632, against £260,765 for 1935-36. The directors have placed £75,000 (against £70,000) to general reserve, and £10,000 (against £45,000) to pensions reserve, while the book value of the goodwill is reduced to £1 by writing off £31,993 (against nil). They recommend the payment of a dividend for the year of 10 per cent. (unchanged) and a cash bonus of 7½ per cent. (against 5 per cent.) and propose to increase the balance forward from £60,060 to £70,569. The proceeds of part of the realisation of the assets of an associated company which has been voluntarily liquidated have been used to write down the remaining interests of subsidiary and associated companies, and with the balance of £78,000 the directors have created a reserve for investments.

Forthcoming Events

Feb. 7 (*Mon.*).—G.W.R. (Birmingham) Lecture and Debating Society, at Great Western Hotel, Snow Hill Station, 6.30 p.m. "The Functions of the Continental Department," by Mr. E. Smout.

Feb. 8 (*Tues.*).—Institute of Transport (Birmingham), at Queen's Hotel, 6 p.m. "Speed of Modern Travel on Railways," by Mr. L. Ball.

Institution of Civil Engineers, Great George Street, London, S.W.1, 6 p.m. "An Experimental Investigation of the Effect of Bridge Piers and other Obstructions on the Tidal Levels in an Estuary," by Prof. A. Gibson.

Permanent Way Institution (Sheffield), at Royal Victoria Hotel, 7 p.m. "Railway Developments," by Mr. W. A. Willox.

Permanent Way Institution (York), at Railway Inst., Queen Street, 6.30 p.m. "Measured Shovel Packing," by Mr. I. Fraser.

Feb. 9 (*Wed.*).—Diesel Engine Users' Association, at Connaught Rooms, Great Queen Street, London, W.C.2, 7 for 7.30 p.m. Anniversary Dinner.

Institute of Transport (Manchester-Liverpool Graduate), at Central Library, Manchester, 6.30 p.m. "Recent Legal Decisions on Transport," by Mr. J. Thomas.

Institute of Welding (Manchester), at College of Technology, 7.30 p.m. "Metallurgical Aspects of the Welding of Alloy Steel," by Mr. T. Swinden.

Institution of Heating and Ventilating Engineers (London), at Park Lane Hotel, 6.30 for 7 p.m. Annual Dinner.

Permanent Way Institution (London), at Underground Railways' Dining Club, Pelham Street, S.W.7, 7 p.m. "Tube Railway Construction under London," by Mr. J. Martin.

Feb. 10 (*Thurs.*).—Diesel Engine Users' Association, at Caxton Hall, Caxton Street, London, S.W.1, 5 p.m. "Supercharging," by Mr. L. Pomeroy.

Institute of Fuel (London), at Junior Inst. of Engineers, 39, Victoria Street, S.W.1, 6 p.m. "Steam and Hot Water Accumulation in an Industrial Plant," by Dr. E. Ritchie.

Institute of Welding (Liverpool), at City Technical College, Byrom Street, 7.30 p.m. "Oxy-Acetylene Cutting of Steel and Cast Iron by Hand and Machine," by Mr. C. Bainbridge.

Institution of Civil Engineers (Yorkshire), at Hotel Metropole, Leeds, 7.30 p.m. "Experiments in Stress Distribution in Reinforced Concrete Arches," by Messrs. R. Evans and I. Moore.

Institution of Electrical Engineers, at Grosvenor House, Park Lane, London, W.1, 7 for 7.30 p.m. Annual Dinner.

Institution of Locomotive Engineers (London), at Inst. of Mechanical Engineers, Storey's Gate, S.W.1, 6 p.m. Informal Meeting.

Feb. 11 (*Fri.*).—Institute of Transport (Newcastle), at Royal Station Hotel, 7.30 p.m. "A Chamber of Commerce at Work," by Mr. G. Ritson.

Institute of Transport (Newcastle Graduate), at Royal Station Hotel, 6 p.m. "The Work of a Dock and Harbour Authority," by Mr. R. Aughton.

Institute of Welding (Midlands), at James Watt Inst., Newhall Street, Birmingham, 7.30 p.m. "Practical Oxy-Acetylene Welding," by Mr. G. Musted.

XUM

CONTRACTS AND TENDERS

The Lima Locomotive Works Inc. has received an order from the Canadian National Railways for six streamlined high-speed passenger locomotives.

The Chicago, Milwaukee, St. Paul & Pacific Railroad has ordered six high-speed streamlined locomotives from the American Locomotive Company.

The Baldwin Locomotive Works has received an order for two passenger locomotives from the National Railways of Colombia, states Reuters.

The L.N.E.R. is to spend nearly £40,000 upon providing new sidings for pit prop traffic at King George dock, Hull. The sidings will be in two groups, the first to hold 840 wagons, on the north side of the dock, the other to hold 600 wagons, on the south side of Nos. 8 and 12 quays. Both groups of sidings will be used to accommodate empty wagons for the quays and laden wagons from the quays to the tenancies or yards. The scheme for the building of the sidings has been facilitated by co-operation between the L.N.E.R. and the pitwood importers.

R. T. Snaith & Son Limited has received a contract from the L.N.E.R. for the modernisation of the Zetland Hotel, Saltburn-by-Sea. The modernisation scheme includes the provision of hot and cold running water in all bedrooms, additional bath rooms, lounge and reading room, new dining room, cocktail bar, new telephones, and improved lighting. The entire hotel is to be tastefully redecorated and reappointed. The value of the contract is over £10,000.

W. G. Birkinshaw & Co. Ltd. has received an order from the Egyptian State Railways Administration for a quantity of pick beaters (Order No. 10,158). Total cost, £264. Delivery f.o.b. London/Birkenhead.

Buck & Hickman Limited has received an order from the Egpytian State Railways Administration for a quantity of hand tools and implements (Order No. 10,157, Items 3-7). Total cost, approximately £215, f.o.b. London.

Churchill - Redman Limited has received an order from the Buenos Ayres Great Southern Railway for one electrically-driven shaping machine.

Wm. Denny & Bros. Ltd. has received an order from the L.M.S.R. for a twin-screw motor vessel for the conveyance of passengers and motor vehicles between Stranraer and Larne. This vessel will be capable of carrying from 70 to 80 vehicles on one deck, and arrangements will be made to permit of motor vehicles running on and off the ship under their own power both at Stranraer and Larne. Principal dimensions of the vessel will include length (between perpendiculars) 308 ft., breadth (moulded) 46 ft., and depth (moulded) 16 ft. 6 in., while the speed will be 19 knots. The public rooms, decorated and furnished in the most modern style, will include first class dining saloon, smoke room, and lounge, and third class dining saloon and lounge. A limited number of private sleeping cabins will also be provided.

Central Line Reconstruction, L.P.T.B.

Kinnear, Moodie & Co. Ltd. has received a contract from the London Passenger Transport Board for the lengthening of platforms on the Central Line at Oxford Circus, Holborn, Chancery Lane, and Holland Park stations. This is an important step in the reconstruction of the Central tube from Wood Lane to Liverpool Street—one of the key works of the £40,000,000 programme of extensions and development. The first object of the reconstruction is to enable the board to discard the rolling stock built specially for the Central Line and to use standard stock, with its larger capacity and higher maximum speeds. To do this the tube is being re-aligned. A fourth current rail is to be laid for the use of standard stock and the line equipped with new signalling. The platforms are being lengthened about 35 yd. to accommodate eight-car trains. Normally this would not be a difficult task, but the Central Line is built on the switchback principle to assist the braking and acceleration of trains. The line rises one ft. in 60 ft. approaching a station and falls away at the rate of one ft. in 30 ft. on leaving a station. Platforms could not be extended on these gradients, so the track is being raised in the new station tunnels, and the roof of the running tunnels beyond raised also to give flatter grades.

Metropolitan-Cammell Carriage & Wagon Co. Ltd. has received an order from the L.M.S.R. for 150 four-wheeled vans for the conveyance of motorcars.

The Directors of the Great Western Railway have authorised the placing of the following contracts :—

A. N. Coles (Contractors) Limited : Construction of a warehouse at Plymouth (Millbay) Docks.

The Cleveland Bridge & Engineering Co. Ltd. : Extension of the carriage shed at Old Oak Common.

W. T. Nicholls Limited : Extension of goods shed at Park Royal.

H. Smith : Earthwork for additional accommodation between Cwm and Ebbw Vale.

J. Pearce : Redecoration of dining room at Tregenna Castle Hotel, St. Ives.

E. A. Foulds Limited : Supply and installation of a 2-cwt. electrically-driven service lift for Royal Hotel, Paddington Station.

A. Herbert Limited : Supply of a combination turret lathe for "W" Shop, Swindon locomotive works.

The Penarth Pontoon, Slipway & Ship Repairing Co. Ltd. : Overhaul of steam hopper barge *Foremost* 44.

Willoughby (Plymouth) Limited : Overhaul of ss. *The Mew*.

Holman Bros. Ltd. has received an order from the Buenos Ayres Great Southern Railway for two Holman two-stage electrically-driven air compressors.

Tenders are invited by the Egyptian State Railways Administration, receivable in the Chief Inspecting Engineer's Office, 41, Tothill Street, London, S.W.1, for the supply of 14,500 fog signal detonators.

Coaches Required for Egypt

Tenders are invited by the Egyptian State Railways Administration, receivable at the General Management, Cairo station, by March 1, for the supply of alternatively 4 or 6 first-class bogie coaches ; and receivable by March 17, for the supply of 20 third-class bogie coaches.

Tenders are invited by the Egyptian State Railways Administration, receivable by the Chief Inspecting Engineer's Office, 41, Tothill Street, London, S.W.1, for the supply of 200 solid-drawn steel boiler tubes.

Tenders are also invited, receivable at the Chief Inspecting Engineer's Office, London, for the supply of 12,500 kg. internal-combustion engine oil.

South African Rail Car Enquiry

With reference to the call for tenders (No. 1446) by the South African Railways & Harbours Administration for the supply of railcars, H.M. Trade Commissioner at Johannesburg now reports that owing to the introduction of certain modifications in the specifications the closing date for receipt of tenders has been postponed until March 14. A copy of the modifications is available for loan on application to the Department of Overseas Trade, London, S.W.1.

The Stores Department of the South African Railways & Harbours Administration announces that as in the past some confusion has arisen as to whether or not the administration would accept tenders which had been delayed due to the late arrival of airmail matter, the administration has decided not to accept any such late tenders in future.

The G.I.P.R. Administration is calling for tenders, to be presented in India by March 2, 1938, for the supply and delivery of five superheated and coal-burning locomotive boilers for Y/4 type locomotives. Firms desirous of offering boilers of United Kingdom manufacture can obtain further details of this call for tenders from the Department of Overseas Trade.

Tenders for 2,700 freight cars of varying capacity have been invited by the Canadian Pacific Railway as part of a projected programme involving an expenditure of $10,000,000 on freight equipment. These freight cars comprise 2,000 40-ton steel-sheathed box cars ; 200 twin hopper cars of 100,000 lb. capacity ; 200 steel underframes ; 100 low-sided drop-end gondola cars of 150,000-lb. capacity, and 200 46-ft. flat cars. It is understood this order will be worth well over half of the proposed ten million dollars expenditure. In addition the company has enquired for tenders for the construction of ten locomotives of the Hudson type, with possibility of further locomotive orders in the summer.

OFFICIAL NOTICES

South Indian Railway Company Limited

THE Directors are prepared to receive Tenders for the supply of :—
PRESSED STEEL SLEEPERS, &c.

Specifications and Forms of Tender will be available at the Company's Offices, 91, Petty France, Westminster, S.W.1.

Tenders addressed to the Chairman and Directors of the South Indian Railway Company Limited, marked "Tender for Pressed Steel Sleepers," with the name of the firm tendering, must be left with the undersigned not later than 12 Noon on Wednesday, the 23rd February, 1938.

The Directors do not bind themselves to accept the lowest or any Tender.

A charge, which will not be returned, will be made of £1 for each copy of the Specification.

Copies of the drawings may be obtained at the Offices of the Company's Consulting Engineers, Messrs. Robert White & Partners, 3, Victoria Street, Westminster, S.W.1.

E. A. S. BELL,
Managing Director.

91, Petty France,
Westminster, S.W.1.
2nd February, 1938.

OFFICIAL ADVERTISEMENTS

OFFICIAL ADVERTISEMENTS intended for insertion on this page should be sent in as early in the week as possible. The latest time for receiving official advertisements for this page for the current week's issue is noon on Thursday. All advertisements should be addressed to :—*The Railway Gazette*, 33, Tothill Street, Westminster, London, S.W.1.

Progress of North London Railway Improvements

Considerable progress has been made in the important tube extension and railway electrification programme in North London in which the L.P.T.B. and the L.N.E.R. are co-operating, and on Tuesday last we were afforded an opportunity of examining the works. This scheme, which will cost approximately £6,000,000, comprises the electrification of the L.N.E.R. branch lines from Finsbury Park to Edgware, High Barnet, and Alexandra Palace; doubling the present single track between Finchley (Church End) and Edgware; the provision of a link at Finsbury Park between these lines and the former Great Northern & City tube railway and the construction of a new tube line at Highgate connecting the existing Highgate tube with the L.N.E.R. at East Finchley.

At the existing Highgate tube station (which will eventually be renamed Archway), the tube is being projected to a physical connection with the L,N.E.R. just before East Finchley station. The difference in levels makes it impossible for the tube to rise to the surface before this point, and therefore a new tube station is being built under the existing Highgate L.N.E.R. station to facilitate interchange, especially with the Alexandra Palace branch. The platforms on the two levels will be connected either by escalators or high-speed lifts.

Between the two new tunnels at Highgate (Archway) station, a siding tunnel is being provided for trains terminating there, generally similar to the siding at Kennington. Highgate (L.N.E.R.), East Finchley, Finchley (Church End), and High Barnet stations are being reconstructed and other stations improved. At Edgware the L.N.E.R. passenger station will be closed and the existing tube station enlarged to accommodate the additional train service to and from the L.N.E.R. lines and to provide a convenient joint station for the two lines. Better facilities for the exchange of passengers between road and rail services will be provided at the Finchley (Church End) and Edgware stations.

From Edgware an extension will be built northward to the junction of the Elstree road and the Watford by-pass, near the Aldenham reservoir. This line was authorised by the London Passenger Transport Act, 1937. One of the objects of the extension is to obtain access to a suitable site for a depot which will be provided at Aldenham for the inspection, cleaning, and minor repair of rolling stock. The depot will accommodate about 500 cars.

The Middlesex County Council has approved the names London Transport proposes to give the new stations on the extension. Brockley Hill, at the junction of Green Lane and Spur Road with the Watford by-pass road, just under one mile from Edgware station, will be the first new station. Elstree will be the second station on the line. It will be at Elstree Hill, on the main Edgware to St. Albans Road (Watling Street), close to its intersection with the Watford by-pass road, just over two miles from Edgware. Aldenham will be the name of the terminal station.

At the visit on Tuesday, the party was in charge of Mr. J. P. Thomas, General Manager (Railways), Mr. V. A. M. Robertson, Chief Engineer, and Mr. J. H. Lander, Resident Engineer, all of London Transport. At the portal of the up tube at East Finchley, where trains will enter the tube from the open air, we saw an ingenious device which Mr. Robertson told us was the invention of Mr. Lander. It was evolved by reason of the close proximity of Highgate Wood, which prevented the use of the customary funnel-shaped entrance adopted to minimise passenger discomfort through sudden change in air pressure. The new method consists of providing openings of various sizes in the tube roof which act ahead of the train as air escapes, but are closed by the train itself acting as a piston in a cylinder as it passes. It is hoped that the blow on the eardrums of passengers, when air pressure is suddenly changed, will be eliminated.

When the new works are completed, the services of the L.M.S.R. and L.N.E.R. steam trains over the three L.N.E.R. branches being electrified will be withdrawn and frequent and regular electric train services will be operated by London Transport. The newest type tube stock, now being built, will be used. The seating capacity of seven cars of this stock will equal the seating capacity of eight cars of the stock now in use.

In the House of Commons on Wednesday, Dr. Leslie Burgin, Minister of Transport, stated that the L.N.E.R. expected that electrified services would be running between High Barnet and the City *via* the Highgate tube by the summer of 1939, and hoped that such services might be running between East Finchley and the West End and City respectively some months earlier. The company also expected that electrified services would be in operation between High Barnet and Finsbury Park early in 1940.

The G W.R. and Penzance

Mr. H. E. Tucker, Stationmaster, Penzance, is the President this year of the Penzance Chamber of Commerce. At the recent annual dinner, which was attended by the Lord-Lieutenant of Cornwall (Lieut.-Col. E. H. W. Bolitho), and Mr. F. R. Potter, Superintendent of the Line, G.W.R., Major J. Dewar, Publicity Officer, Mr. Alec. Beecham, M.P., and many others, Mr. S. P. J. Hill, in proposing the toast of "The Guests," said that one of the best friends Penzance had was the Great Western Railway.

Mr. F. R. Potter, in responding, said Penzance was particularly fortunate in being a most delightful centre for development. He reminded them that the G.W.R. was building a new station worthy of the terminus of the G.W.R. line, and was spending £134,000 in providing accommodation for future development. It was for Penzance to respond. In regard to publicity, he advised them to have their own scheme, and disclosed that the G.W.R. was prepared to subsidise them to the extent of 15s. for every £1 they put down. "There is no place I know of in the country which is more amenable as a winter resort than Penzance and its environment," he said, "but what you lack at the moment is entertainment to attract your visitors. We want to see that your hotels and accommodation are adequate for your visitors."

Major Dewar urged the importance of endeavouring to begin the holiday season earlier, pointing out that this part of Cornwall is at its most beautiful and freshest period earlier than the middle of July and August.

XUM

Railway Share Market

The general position in the stock and share markets has continued to be dominated by the very small amount of business passing. Apart from British Government securities, the tendency was again to lower prices, although subsequently the undertone was described as firmer on the hope that more active conditions may develop during the new Stock Exchange account, which begins on Monday next.

Debenture and other prior charge stocks of the home railways were very firm in sympathy with Government securities, while the junior and kindred issues were inclined to attract rather more speculative attention in anticipation of next week's dividend announcements. The Southern's statement is due on Monday, and those of the Great Western and L.M.S.R. on the following Friday, while that of the L.N.E.R. is expected on February 18.

The past week's traffics were below best market expectations, but they must be considered as quite encouraging, bearing in mind all the circumstances.

L.M.S.R. ordinary fluctuated around 27½ under the influence of the varying dividend estimates, which continue to range from 1½ per cent. to 2 per cent. The disposition is to budget for the lower rate, and if 2 per cent. were forthcoming, a rise of several points in the stock would apparently be justified. The 4 per cent. preference at 80 yields 5 per cent., while the 4 per cent. 1923 preference at 67½ gives a return of 5⅞ per cent., which appears unduly generous, as there seems little doubt their dividends have been earned with a better margin in the past year. Southern deferred was fairly steady up to the improved level of 20½, there being general confidence of a dividend of 1 per cent. Great Western ordinary, dividend estimates in respect of which range from 3½ per cent. to 4 per cent., was steady at 64, and inclined to move in favour of holders, particularly as last week's traffics created a good impression. If 4 per cent. were paid a higher price would be justified, as the yield on this basis would be as much as 6¼ per cent. L.N.E.R. second preference, on which it is hoped 1½ per cent. will be paid, was steady around 25, while the first preference, which is, of course, expected to receive its full 4 per cent. dividend was 65¼, at which the yield exceeds 6⅛ per cent. London Transport "C" stock was again firm, awaiting the interim dividend decision.

Movements in foreign railway securities were adverse to holders, general market conditions having prevented improvement in the volume of business. Debenture stocks were also again lower, sentiment regarding the stocks of the Argentine companies having been affected by the weakness of the peso. American railway securities improved, and at 7¼ Canadian Pacific regained an earlier decline.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

	Railways	Miles open 1937-38	Week Ending	Traffics for Week: Total this year	Traffics for Week: Inc. or Dec. compared with 1937	No. of Weeks	Aggregate Traffics to Date: Totals: This Year	Aggregate Traffics to Date: Totals: Last Year	Aggregate Traffics to Date: Increase or Decrease	Shares or Stock	Prices: Highest 1937	Prices: Lowest 1937	Prices: Feb. 2, 1938	Yield % (See Note)
				£	£		£	£	£					
South & Central America	Antofagasta (Chili) & Bolivia	834	30.1.38	15,630	— 40	5	71,030	66,340	+ 4,690	Ord. Stk.	29	10¼	12	Nil
	Argentine North Eastern	753	29.1.38	7,320	— 782	31	293,265	278,659	+ 14,606	„	19¼	6	5½	Nil
	Argentine Transandine	—	—	—	—	—	—	—	—	A. Deb.	93½	60	80	5
	Bolivar	174	Dec., 1937	3,900	— 1,700	52	59,550	74,200	— 14,650	6 p.c. Deb.	9½	5	8½	Nil
	Brazil	—	—	—	—	—	—	—	—	Bonds.	17	9	9½	5¼
	Buenos Ayres & Pacific	2,806	29.1.38	102,419	— 9,802	31	2,518,427	2,552,710	— 34,283	Ord. Stk.	17⅞	5½	5½	Nil
	Buenos Ayres Central	190	15.1.38	$106,300	— $47,600	29	$3,632,400	$4,110,300	— $477,900	Mt. Deb.	41½	18	17½	Nil
	Buenos Ayres Gt. Southern	5,084	29.1.38	211,104	— 20,658	31	4,223,138	4,041,271	+ 181,867	Ord. Stk.	33¾	13½	15	Nil
	Buenos Ayres Western	1,930	29.1.38	45,223	— 23,449	31	1,411,601	1,426,877	— 15,276	„	31¾	11¼	10½	Nil
	Central Argentine	3,700	29.1.38	115,779	— 74,091	31	3,903,088	4,505,037	— 601,949	„	34¼	10¾	10½	Nil
	Do.	—	—	—	—	—	—	—	—	Dfd.	20½	4½	5	Nil
	Cent. Uruguay of M. Video	980	22.1.38	20,176	+ 926	30	509,841	505,132	+ 4,709	Ord. Stk.	67/32	2	2½	Nil
	Cordoba Central	1,218	29.1.38	24,880	— 6,390	31	920,260	1,004,830	— 84,570	Ord. Inc.	6¼	1½	1½	Nil
	Costa Rica	188	Nov., 1937	22,336	+ 2,744	22	123,362	91,581	+ 31,781	Stk.	38	27	28½	7
	Dorada	70	Nov., 1937	15,800	+ 1,000	48	170,100	156,500	+ 13,600	1 Mt. Db.	107	106	107½	5 9/16
	Entre Rios	810	29.1.38	17,053	+ 924	31	443,687	407,914	+ 35,773	Ord. Stk.	19 7/16	6	5	Nil
	Great Western of Brazil	1,092	29.1.38	10,200	— 100	5	41,300	42,800	— 1,500	Ord. Sh.	¾	1/8	3/8	Nil
	International of Cl. Amer.	794	Nov., 1937	$509,126	+ $82,245	48	$5,379,250	$4,650,651	+ $728,599	—	—	—	—	—
	Interoceanic of Mexico	—	—	—	—	—	—	—	—	1st Pref.	2/-	1/-	1/2	Nil
	La Guaira & Caracas	22¾	Dec., 1937	4,890	— 1,335	52	61,575	56,700	+ 4,875	Stk.	8½	6	8½	Nil
	Leopoldina	1,918	29.1.38	21,169	— 2,431	5	80,699	91,331	— 10,632	Ord. Stk.	9¼	3	3½	Nil
	Mexican	483	21.1.38	$232,700	— $7,900	3	$738,000	$856,500	+ $118,500	„	1½	1/4	1/2	Nil
	Midland of Uruguay	319	Dec., 1937	9,910	+ 1,003	26	52,414	50,223	+ 2,191	„	1 7/8	1/2	1/2	Nil
	Nitrate	384	31.1.38	9,653	+ 4,359	5	16,429	12,075	+ 4,354	Ord. Sh.	3 1/16	2	2¼	Nil
	Paraguay Central	274	29.1.38	$2,732,000	— $589,000	31	$98,385,000	$81,637,000	+ $16,728,000	Pr. Li. Stk.	84	79¼	76½	7 13/16
	Peruvian Corporation	1,059	Dec., 1937	76,908	— 4,604	26	504,036	490,785	+ 13,251	Pref.	14⅝	4½	5	Nil
	Salvador	100	22.1.38	¢40,250	— ¢2,000	30	¢495,375	¢505,008	— ¢9,633	Pr. Li. Db.	23½	21½	22½	Nil
	San Paulo	153½	23.1.38	32,537	— 1,211	4	95,785	98,977	— 3,192	Ord. Stk.	98½	56	55½	9
	Taltal	160	Dec., 1937	6,185	+ 2,095	26	22,535	20,900	+ 1,635	Ord. Sh.	1 1/16	11/16	¾	13 5/16
	United of Havana	1,353	29.1.38	34,494	+ 178	31	540,000	520,649	+ 19,351	Ord. Stk.	5⅜	5 1/32	2	Nil
	Uruguay Northern	73	Dec., 1937	991	— 519	26	5,294	6,564	— 1,270	Deb. Stk.	10	2	3½	Nil
Canada	Canadian National	23,803	21.1.38	631,460	— 27,610	3	1,788,896	1,891,991	— 103,095	—	—	—	—	—
	Canadian Northern	—	—	—	—	—	—	—	— 4 p.c.	Perp. Dbs.	77	62½	70½	5 11/16
	Grand Trunk	—	—	—	—	—	—	—	—	4 p.c. Gar.	101⅞	94½	100	4
	Canadian Pacific	17,186	21.1.38	474,800	+ 600	3	1,404,600	1,388,400	+ 16,200	Ord. Stk.	18	7¼	7½	Nil
India†	Assam Bengal	1,329	10.1.38	37,605	— 3,661	41	1,068,262	1,025,847	+ 42,415	Ord. Stk.	86	73½	81	3 11/16
	Barsi Light	202	31.12.37	5,940	+ 2,295	39	100,327	87,165	+ 13,162	Ord. Sh.	66½	46	57	8¾
	Bengal & North Western	2,107	10.1.38	75,225	— 6,774	14	757,959	775,913	— 17,954	Ord. Stk.	317	301	309	5 15/16
	Bengal Dooars & Extension	161	10.1.38	3,272	+ 235	41	116,159	104,661	+ 11,498	„	100	84	86½	7
	Bengal-Nagpur	3,268	10.1.38	199,425	+ 48,929	41	5,383,240	4,668,594	+ 714,646	„	101	89	90½	4 7/16
	Bombay, Baroda & Cl. India	3,072	20.1.38	262,500	— 47,250	43	7,044,000	6,899,925	+ 144,075	„	113	110½	111½	5⅝
	Madras & Southern Mahratta	2,937	10.1.38	154,425	— 11,984	41	4,263,528	4,285,188	— 21,660	„	110	105	107½	7 3/16
	Rohilkund & Kumaon	571	10.1.38	16,413	— 566	14	135,309	141,430	— 6,121	„	314	302	309	5 13/16
	South Indian	2,531½	31.12.37	146,038	+ 14,932	39	3,136,691	3,011,165	+ 125,526	„	103½	99½	100½	4¾
Various	Beira-Umtali	204	Nov., 1937	90,637	+ 21,848	9	186,351	137,294	+ 49,057	—	—	—	—	—
	Egyptian Delta	620	10.1.38	7,838	— 26	41	208,935	198,541	+ 10,394	Prf. Sh.	31/-	¾	1¼	Nil
	Great Southern of Spain	—	—	—	—	—	—	—	—	Inc. Deb.	3½	1/8	3½	Nil
	Kenya & Uganda	1,625	Dec., 1937	195,953	— 9,301	52	2,710,000	2,527,158	+ 182,842	—	—	—	—	—
	Manila	—	—	—	—	—	—	—	—	B. Deb.	48⅛	43½	45½	8¾
	Midland of W. Australia	277	Nov., 1937	14,455	+ 1,259	22	69,130	67,251	+ 1,879	Inc. Deb.	98	93½	93½	4¼
	Nigerian	1,900	18.12.37	74,313	+ 6,386	38	1,958,802	1,576,260	+ 382,542	—	—	—	—	—
	Rhodesia	2,451	Nov., 1937	428,233	+ 94,574	9	895,596	688,890	+ 206,706	—	—	—	—	—
	South Africa	13,263	15.1.38	644,944	+ 22,865	42	26,849,179	25,379,700	+ 1,469,479	—	—	—	—	—
	Victoria	4,774	June, 1937	793,223	+ 89,530	52	10,135,291	9,689,925,§	+ 445,366	—	—	—	—	—
	Zafra & Huelva	112	Sept., 1937	15,307	+ 8,641	39	117,046	65,948	+ 51,098	—	—	—	—	—

NOTE.—Yields are based on the approximate current prices and are within a fraction of 1/16.

† Receipts are calculated @ 1s. 6d. to the rupee. § ex dividend.

The variation in Sterling value of the Argentine paper peso has lately been so great that the method of converting the Sterling weekly receipts at the par rate of exchange has proved misleading, the amount being overestimated. The statements are based on the current rates of exchange and not on the par value.

Electric Railway Traction

Electric Equipment in America

AT a recent meeting of the Electrical Section of the Engineering Division, Association of American Railroads, it was stated that an American manufacturer had made a laboratory study of changes in the crystalline structure of heat-treated rails where welded bonds were used. The tests were said to have shown a reduction in the hardness of such rail ends due to attaching the bonds by gas welding. It was found also that if the rail was re-treated on the site after the bond had been welded, it was possible to damage seriously the bond conductor unless it was protected by a plastic asbestos covering during heat treatment, and similar damage to the bond could occur when battered rail ends were being built up. New equipment developed in America included surge-proof transformers, an air-core inductance and combined capacitance for lightning protection and series capacitors with improved insulation against surge. The latter device is of particular interest to lines operating extended signal power circuits where voltage variation is a problem. High-tension cable installations during 1937 used oil-filled cable exclusively, in preference to the old solid-type cable of the 69 kV. classification. No troubles have been experienced with the Oilostatic or Pirelli-type cables of the 132 kV. high-tension line of the Pennsylvania Railroad's electrification. Some electrolysis in the conduits of both types has been eliminated. Corrosion of equipment showed varying results, but it was agreed that the cracking or notching of supposedly corrosion-resisting wires and cables was a problem. On one line a bronze cable had cracked after being in service 18 months in salt-water air on a route with a partial steam service.

The Electrical Trade

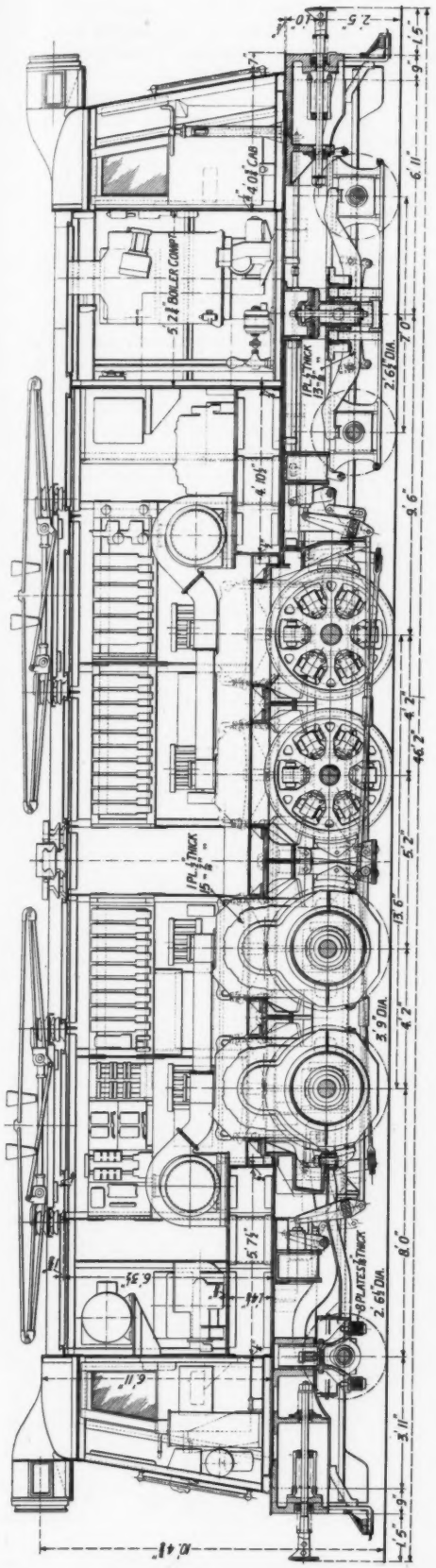
A RECENT report on the electrical industry in France makes it clear that whatever the " economic " position of a civilised country at the present time, it is only very special circumstances which can bring about a great increase in the consumption of electricity. It is pointed out that while electricity in France is cheap compared with its cost in certain other countries, there has been no balancing " economic " recovery, and it is admitted that even while the total railway load is small, the effect of such electrifications as that from Paris to Le Mans, with an electrified track mileage of 500, is being partly counterbalanced by the abandonment of a number of tramways. Great efforts are being made to increase production facilities, but the consumption, which surely is the sole reason for production, has increased by merely 5½ per cent. over the figures for 1935. Yet all that can be said about this extremely small increase in France is that it appears to be " chiefly due to the development of the domestic use of electricity, brought about by extensive advertising and facilitated by the low rates." Evidently the rates were still not low enough, for there can be no question that the people would like to use more electricity. It is asserted, too, that the electrical engineering industry has declined in France during the past year, and this is in line with an independent investigation on the heavy electrical industry in Britain made a couple of months ago, which found that the peak had just been passed, and that by the end of this year comparatively few orders would be coming in. It is obvious that this will not be because railways and industrial organisations will not want heavy electrical equipment; it will be because they feel they cannot afford them. Here again is an example of the restriction of real productive capacity for the sole reason that potential demand is not backed by the financial means to make it actual, the objectives of both producers and consumers thus being frustrated. Rectify this restrictive influence, and demand will be ample to satisfy simultaneously the ambitions of producers and the desires of consumers.

Early French Electrifications

THERE were one or two early experiments in electric traction made in France 30 to 40 years ago which deserve brief mention, for they are not widely known, although one of them is still in successful existence. Before the end of the 19th century the P.L.M. Railway began to experiment with electric traction on the Montmartre-Béraudière section of the Clapier-Béraudière branch in the neighbourhood of St. Etienne. This branch served a mining district, and the Clapier-Montmartre portion, with grades up to 1 in 15, was worked by cable traction. On the second division, with grades up to 1 in 70, a 30 h.p. four-wheeled electric locomotive, rebuilt from an old luggage van, replaced steam traction at the beginning of 1897, but the whole branch was closed in May, 1897, so that this locomotive had a short working life. Direct current at a tension of 360 volts was picked up from a third rail by two copper shoes mounted on an oak beam, and the single motor drove the two axles through chains. Current was produced in a tiny generating station, the boiler in which was one from an old P.L.M. Crampton locomotive. In November, 1897, trials began between Paris and Melun with a six-wheeled 600 h.p. locomotive. To save the expense of overhead or third rail construction and the provision of a generating station, the locomotive contained a battery which could provide current for moving it at 4 to 5 m.p.h., and pulled behind it an eight-wheeled 45-ton van housing two 96-cell batteries which could furnish a peak current of 1,000 amp. and a normal current of 500 amp. at a tension of 360 volts. Over a dozen years after these trials, in 1911, a 4½-mile length of line between Grasse and Mouans-Sartoux, on the Cannes-Grasse line, was equipped with overhead construction with a contact line fed by 12-kV. 25-cycle single-phase current, and a 134-ton 2-Bo + Bo-2 locomotive was built, and hauled 225 to 235 ton trains at 40 to 43 m.p.h. There were four motors with a one-hour rating of 400 h.p. each. Another early scheme of great interest was the electrification in 1904 of the St. Georges Commier—Le Mure metre-gauge line at 2,400 volts d.c., this being the first high-tension d.c. line in the world. This line is still operated on the same system, and extensions have been made. It lies a little to the south of Grenoble, and is characterised by steep and long grades.

XUM

This is the first of the main line electric locomotives for the New Zealand Government Railways. It is shown on the Preston test track of the builder, the English Electric Co. Ltd. Electrical and other equipment for nine further locomotives has been shipped from England. A description is given on the opposite page



General arrangement of 2-Do-1 electric locomotive for the 1,500 volts d.c. system of the New Zealand Government Railways 3 ft. 6 in. gauge lines. The output on the one-hour rating is 1,240 h.p., the wheels are of 45 in. diameter and the gear ratio is 1 : 3·74. It is intended to operate these locomotives in both North and South Islands

MAIN-LINE ELECTRIC LOCOMOTIVES FOR NEW ZEALAND

10 locomotives with an output of 1,240 h.p., a weight of 88 tons, and a maximum tractive effort of 34,000 lb. are to go into service in the North and South Islands

OVER the 25-mile section of the North Island main line between Wellington and Paekakariki, now being electrified on the 1,500 volt d.c. system, the New Zealand Government Railways are to put into service eight 2-Do-1 locomotives for working both passenger and goods trains. The first of these has been built complete by the English Electric Co. Ltd. as main contractor, with R. & W. Hawthorn, Leslie & Co. as subcontractor for the mechanical portion; the last seven locomotives are being erected and partly built at the Hutt Valley shops of the New Zealand Government Railways, but all the electrical equipment has been supplied by the English Electric Co. Ltd., and some of the main mechanical portion constituents by Hawthorn, Leslie through English Electric.

The requirements include the haulage of 250-ton passenger trains at speeds up to 55 m.p.h. (the maximum) and 500-ton freight trains at speeds up to 45 m.p.h., and the 500-ton load must be started and accelerated to 20 m.p.h. on the 1 in 57 grade approaching Pukeria Bay. The maximum axle load is limited to 16 tons, and to keep within this figure and at the same time enable the electrical equipment to be satisfactorily housed, a pony axle and a four-wheel bogie were incorporated in the design.

Electrical Equipment

Four single-armature motors are provided on each locomotive, and are connected in series-parallel with two groups of two motors in permanent series. The motors are rigidly bolted to locomotive frame stays, and spur gearing, consisting of a 19-tooth nickel-steel pinion and a 71-tooth gear wheel, is provided between the armature and a quill concentric with the axle.

The quill transmits the motor torque to the axle through springs, giving flexibility to the drive. The entire weight of the motor is thus springborne, leaving only the dead weight of the wheels and axles unsprung. The quill consists of a hollow steel shaft fitted over the axle between the road wheels and carried by bearings supported from the motor frame, thus ensuring that the quill will always remain parallel to, and a fixed distance from, the armature shaft. The solid steel gear wheel is shrunk on to a cast steel centre keyed to one end of the quill.

Clearance is provided between the inside of the quill and the axle to allow for both eccentric and angular displacement of the latter due to the movement of the axleboxes in the horn blocks. At each end of the quill a set of six spring cup brackets is carried, and these brackets are secured to suitable faces on the flange remote from the gear wheel and on the gear wheel centre. The torque of the traction motor is transmitted from the quill to the bracket by means of radial keys, and each bracket is secured to the quill by means of two studs which do not transmit any forces. Centrifugal force is taken by spigots and the bracket faces; these brackets project between the spokes of the driving wheels and carry the spring cup units which transmit the motor torque to the driving wheels. A spring cup drive unit consists of a housing containing a strong compression spring, which is held in place by two casehardened steel cups fitted over each end of it, and sliding in casehardened bushings at each end of the housing. The cups are provided with

shoulders which engage the inner faces of the bushings, thus limiting the outward travel. The inner faces of the cups are adapted to engage before the spring goes solid under extreme compression. The spring is of the highest grade spring steel and is only moderately stressed, and provision is made for injecting grease lubricant into the housing.

Each of these cup drive units engages in either direction of locomotive travel with the spokes of the driving wheel, to which are welded hardened steel plates to take the thrust. When free the cups are slightly clear of these pads, which are of sufficient area to allow a considerable amount of freedom of relative movement between the quill and the axle. The chief advantages claimed for this type of drive are: (*1*) The springs are subjected only to pure compression stresses and do not experience any twisting or shear effects. (*2*) Each cup drive unit can be removed and replaced separately without dismantling any part of the quill or the road wheels. (*3*) Adequate lubrication both of the moving parts and of the driving unit itself and of all running surface is provided. (*4*) In the event of a spring breaking the broken parts remain enclosed in the cup and cannot cause damage to other parts of the mechanism. In an emergency the gear would continue to operate for a time with a broken spring. (*5*) No bolt is subjected to shear or bending stresses. (*6*) The torque is transmitted direct to the road wheel spokes. (*7*) The drive provides resiliency between the gear and road wheels. (*8*) The whole of the spring cup quill drive is open to easy inspection.

The motors are force-ventilated by motor-driven blowers which draw the cooling air through Visco metallic filters in the locomotive sides. The air passes *via* sheet-steel ducting to the motor air intake and is discharged through screened outlets at the pinion end of the motor frame. The continuous output is 225 h.p. and the one-hour rating 310 h.p. at 345 amp. and 750 volts. On the continuous rating the temperature rise by resistance is 105 deg. C., and in the one-hour rating 120 deg. C.

Electro-pneumatic unit switch control is provided. The whole of the 1,500-volt control gear is mounted in an interlocked high-tension compartment in the locomotive superstructure and all high-tension apparatus must be made dead before access can be obtained. In the main high-tension compartment the accelerating resistances have been mounted along one side, and on the opposite corridor side are mounted the contactors. All contactor interlocks are maintained from the corridor, interlocked doors being provided in the partition between the h.t. compartment and the corridor to give the necessary access. The motor-generator, blowers, and compressor motors are also mounted in this compartment, and the starting equipment for these machines is situated in an auxiliary high-tension compartment with the switch-handles arranged for operation from one driver's cab. Current is collected by means of two double-pan pantographs individually controlled through electro-pneumatic valves by push-button switches in each driver's cab. The pantographs are of light-weight construction with pans lubricated with Grafolube, a mixture of graphite and a special lacquer.

Mechanical Portion

The main frame of the locomotive is built up of two 41 ft. 10 in. by 2 ft. 3 in. by 4½ in. rolled steel slabs,

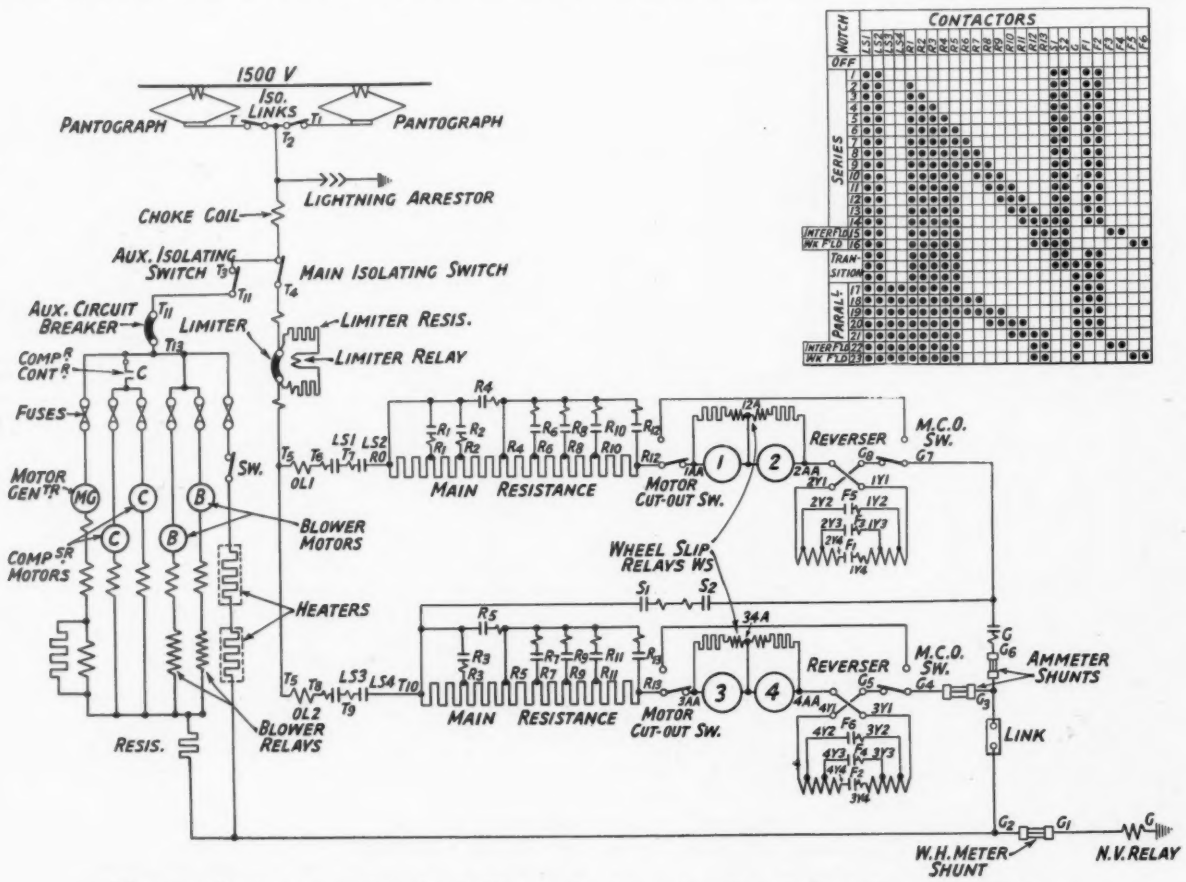


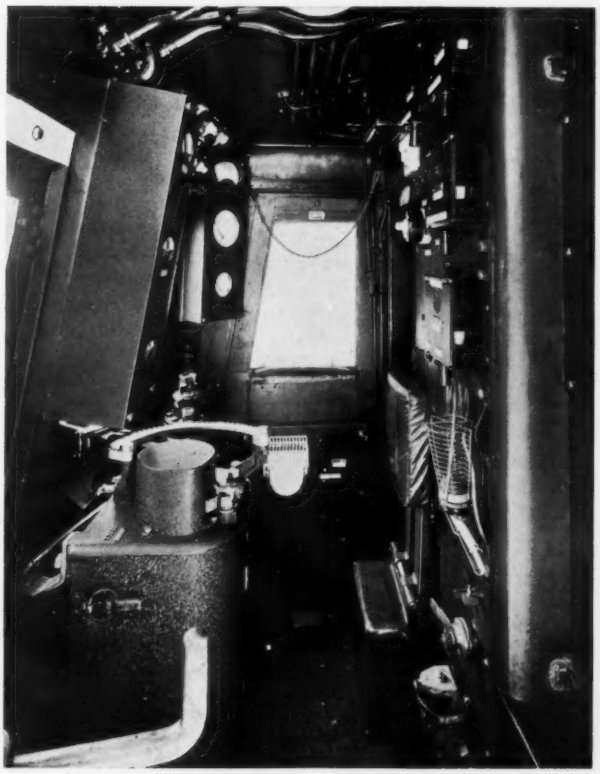
Diagram of power connections for 1,240 h.p. d.c. locomotive, New Zealand Government Railways

securely riveted to massive cast iron drag castings at each end, which carry the central buffing and draw gear. The frame slabs are burnt out as required for the axlebox horn guides. Frame stays are located at the requisite points, to enable them to be used as supports for the main driving motors.

All wheels have cast steel centres with rolled steel tyres shrunk on, these being secured by the usual retaining rings, and all the wheels are pressed on to the axles in the usual manner. The driving wheels have special spokes designed to work in conjunction with the spring cup individual axle drive. All axleboxes are of cast steel and are fitted with S.K.F. roller bearings. Renewable wearing strips of manganese steel are fitted to the horn faces. All springs are of laminated leaf type, and compensation is provided between all the driving axles and the pony axles. The bogie is not included in the general compensation scheme but the bogie axles are equalised in the usual manner. Both the pony truck and bogie truck are provided with swing link suspension, and sufficient transverse displacement is allowed to ensure satisfactory running on five-chain curves.

The superstructure of the locomotive is of sheet steel on tee-section framework. It is sub-divided into compartments for the housing of the electrical equipment and the steam boiler, and there is a corridor communication between the driving compartments at each end. The roof is provided with removable hatches of convenient size to facilitate the removal of the larger items of equipment for maintenance or renewal. Three bands of aluminium alloy running along the sides and curving down to the front of the locomotive serve to accentuate the lines. A driving position is provided at each end of the locomotive; the cab is entered by doors at the front of the locomotive and communicating doors to the corridor are provided. A dead-man pedal device is incorporated, and in addition there is a control to prevent the locomotive being started if the brake air pressure is not up to the standard. Westinghouse type A.7.E.L. automatic and straight air brakes are fitted, and automatic control is thus available for train braking and the straight air brake for locomotive only or freight train marshalling. In addition, a hand brake, which can be brought into operation independently of the air brake, is provided at each end of the locomotive. Other pneumatically operated details include windscreen wipers and sanding gear, and the sanding gear is arranged to ensure adequate sanding in both forward and reverse running, and is controlled by foot-operated pedals.

Single armature 310 h.p. motor with individual axle drive and 45 in. wheels



Driving cab of New Zealand locomotive

Lubrication of the locomotive mechanical parts, and wherever possible, of the electrical equipment, is by grease, suitable nipples being provided at all necessary points for use with a pressure gun. A Sentinel-type oil-fired boiler is installed for steam heating of the passenger coaches and is located at one end of the locomotive between one driving cab and the main high-tension compartment; the boiler is fully automatic in operation. A cowl is provided over the flue pipe to prevent the ingress of water and to deflect flue gases from being blown on to the overhead line.

In addition to the eight equipments so far described, an additional two sets are being supplied for service on the Otira—Arthur's Pass section of the New Zealand Railways in South Island. On account of the severe gradient (1 in 33) for a distance of five miles through the Otira tunnel, modifications have been made in these equipments to provide for rheostatic braking, and with the omission of the boiler and high-speed current limiter, necessitated by space requirements for the braking resistance. As far as possible the Otira locomotives are duplicates of the eight for the Wellington—Paekakariki section. Material for the mechanical parts of these English Electric locomotives is being supplied by Robert Stephenson & Hawthorns Ltd., and the locomotives will be erected and equipped by the New Zealand Government Railways.

XUM

NORWEGIAN STATE RAILWAYS ELECTRIFICATION

THE electrified route mileage of the Norwegian State Railways now amounts to 215, and the track mileage to 337. The route mileage forms 9·5 per cent. of the whole State Railways' system, and carried in the fiscal year 1936-1937, 19·4 per cent. of the total traffic, measured in locomotive and motor-coach km. Parliament has decided to electrify the Østfold line from Ski to Kornsjø, 135 km. (84 miles), or 174 km. (108 miles) of track. The Flåm line will be worked electrically from the beginning, and then 28 per cent. of the total traffic will be electrically hauled. There are now 50 electric locomotives, with a total h.p. of 70,910, and 17 motor-coaches, totalling 10,070 h.p.; 20 more locomotives and 27 motor-coaches are required for the extensions. An electric locomotive of 2,800 h.p. and with a top speed of 62 m.p.h. is under consideration for the Østfold line. Multiple-unit working is being increasingly used for local services, and a new design of car has been built for the Oslo—Kolbotn section of the Oslo—Ski route. These cars have pneumatically-operated double centre doors, and pressure ventilation and heating. A similar type will be used between Oslo and Sandvika on the Drammen line. It has been decided to equip all rolling stock with compressed air braking, an important step which may have much effect on traffic development, and an agreement has been made with the German suppliers providing for some of the equipment to be made at Kongsberg Iron Works.

BREVITIES

SOUTHERN RAILWAY TRIALS.—Electric trial trains began to run over the section from Dorking to Warnham on Sunday, January 30, which forms part of the Southern Railway's Surrey and Sussex electrification extension schemes.

GLASGOW SUBWAY.—The Glasgow Corporation has approved alterations to the Partick Cross, Kelvin Bridge, and Bridge Street stations at a total cost of £3,600. Proposals to extend the subway are being examined by the Corporation's transport committee.

SWEDISH PRIVATE CONVERSION.—The Hälsingborg-Hässleholm Railway is reported to be seeking permission from the Riksdag to electrify the 48 miles of its standard-gauge line from Hälsingborg through Åstorp to Hässleholm at an estimated cost of 2,400,000 kr. The total length of the railway is 93 miles.

FRENCH ELECTRIFICATION.—It is anticipated that when the Tours—Bordeaux section of the French National Railways is turned over to electric traction, the annual traction current consumption of the National Railways will be in the neighbourhood of 600,000,000 kWh. yearly, for an electrified route mileage of about 2,050.

SWEDISH STATE PROPOSALS.—In the proposals of a committee appointed by the Swedish Minister for Social Affairs to consider plans for coping with unemployment, is included an extraordinary capital expenditure of about £4,500,000 for railway electrification works to be put in hand should unemployment again become a serious problem.

DICK KERR ASSOCIATION.—An association of old Dick, Kerr men has been formed. The first reunion dinner was held recently, and Mr. Douglas Kerr, Cannon Croft, Pinner, Middlesex, would be very glad to have the names and addresses of any old Dick, Kerr men who were not invited. It is hoped that the next reunion will be held sometime in June, 1938.

GERMAN MAIN-LINE LOCOMOTIVES.—A total of 44 single-phase electric locomotives are being delivered by the A.E.G. to the Reichsbahn, mainly for service on the Nuremberg—Halle—Leipzig division, now being electrified. Although the one-hour rating is 4,500 h.p., an output of 6,200 h.p. has been reached, and on test a nine-car train weighing 360 tons has been hauled at a speed of 103 m.p.h.

GIANT SWISS LOCOMOTIVE.—The Swiss Federal Railways are to place an order for a twin-unit electric locomotive generally similar to the two which were built in 1931 and which have since been working express and freight traffic on the Gotthard route, where they have proved highly satisfactory. The new locomotive is to be shown at the Swiss National Exhibition at Zurich in 1939.

SOVIET ELECTRIFICATION.—Studies are being made for the electrification of the suburban lines from Kiev out to Motovilovka and Fastov, and it is proposed also to extend the Moscow suburban electrification down the Dzerzhinski railway to Tsaritsino, and eventually to Tula. Two fast multiple-unit trains are to be built for service on the Yaroslavl line between Moscow and Alexandrovsk, which was electrified last year.

ITALIAN ELECTRIFICATION.—There are now 2,435 route miles of the Italian State Railways electrified, and according to the present programmes this total will have increased to 2,600 miles by the end of October next, and to 3,160 miles by the end of October, 1939. The current consumption during the fiscal year 1935-36 was 612,000,000 kWh., and it is expected that the consumption for 1937 will have risen to almost 800,000,000 kWh.

PENNSYLVANIA ELECTRIFICATION.—The 83-mile main line of the Pennsylvania Railroad between Paoli (near Philadelphia) and Harrisburg was turned over to partial electric operation on January 15, when an inaugural train was hauled by one of the 7,000 h.p. 2-Co + Co-2 electric locomotives of the GG-1 class. When the yards and branches along this route are electrically equipped, the Pennsylvania will have about 2,675 miles of track electrified on the 11 kV. 25 cycles single-phase system.

WATERLOO & CITY RAILWAY.—A programme of improvements on the Waterloo & City Railway, including the provision of entirely new rolling stock capable of carrying practically double the existing number of passengers, has been authorised by the Southern Railway. The new stock will have larger doors which should eliminate queues at peak hours. The signalling arrangements, cables, and switchgear are also to be renewed and the conductor rail placed in a new position, in addition to which certain lesser improvements, such as the welding of rail joints, noise-absorbing shields and " pinch wire " emergency communications, will be introduced. Arrangements are also to be made for the issue and collection of tickets at terminal points instead of in the trains as at present. The improvements are to be put in hand at once and it is anticipated that the work will be completed in two years.

BRITISH TWO-POWER ELECTRIC LOCOMOTIVES

Heavy units for use of the engineering department in the construction and maintenance of standard-gauge tube and surface lines with restricted loading gauge

The first of the new L.P.T.B. 600 b.h.p. service locomotives

NINE battery-electric locomotives are being acquired by the London Passenger Transport Board for new works and maintenance service. Three of them have Metro-Vick metadyne electrical equipment and six have the G.E.C. series resistance control. The metadyne locomotives incorporate the bogies and control equipment of the original metadyne passenger cars of the L.P.T.B. The mechanical portions of the locomotives are being built by the Gloucester Railway Carriage & Wagon Co. Ltd. All nine locomotives can operate either on battery power or on current drawn from the conductor rail.

These locomotives are to be used first on the new works connected with the extension of the Central London Railway. In platelaying operations two locomotives coupled in multiple-unit will propel a 200-ton train consisting of five rail wagons and two 30-ton flat wagons from the depot to the working site, which may be almost five miles away; about $1\frac{3}{4}$ miles will be run at slow speed on the temporary track in the tubes, and the remainder will be run in the open at speeds high enough to prevent interference with normal traffic. On the site, the locomotive will inch forward its train over a track that may be wet and uneven, as well as up a grade of 1 in 30. At the conclusion of this duty the empty train is hauled back to the depot and the wagons shunted into position for loading, the whole duty occupying about nine hours.

When engaged in the laying of conductor rails, two locomotives in multiple-unit will haul a 200-ton train to sites up to seven miles from the depot, and without interruption to traffic. Once at the site the locomotives will propel their train forward 44 times for 60 ft. at a time, with an unloading of material at the end of each movement. The return to the depot is made with a trailing load of 100 tons, and the whole duty cycle, lasting perhaps 12 hr., is carried out on battery current. In cable-laying duties one locomotive hauls a 100-ton train at a steady speed of 3 m.p.h., without sections of the battery being paralleled.

In permanent way maintenance operations two locomotives will haul a 250-ton trailing load at a balancing speed of 30 m.p.h. on level track when drawing 600 volts d.c. from the conductor rail, and 15 m.p.h. minimum when drawing current from the battery. In general, current is drawn from the conductor rail when going to or returning from the site, and from the battery when work is actually being performed. The normal requirements from the battery on one turn of duty are equivalent to 60 half-mile cycles with current on up to the moment type braking.

Each locomotive has four nose-suspended traction motors with a one-hour rating of 150 h.p. at 600 volts. In the metadyne locomotive the control is notchless and is particularly suitable for inching forward or running steadily at very low speeds; the regenerative braking feature of the metadyne is not used in these locomotives. The metadyne itself is located beneath the underframe at about mid-length. The motors of the six locomotives with G.E.C. resistance control can be coupled in series, series-parallel, or full parallel. The driver's controller at each end of the locomotive incorporates a power selection switch for the choice either of battery or conductor rail current, and there are five notches on each.

Practically the whole of the locomotive body is taken up by the battery room, which houses 160 cells of the lead-acid type supplied by the D.P. Battery Co. Ltd., arranged in two groups with a central gangway between. The capacity on the five-hour rate of discharge is 768 amp. hr., and the weight of the complete battery is about 13 tons. In the metadyne locomotives the charging current supplied through the metadyne is 200 amp. until the voltage per cell is 2·4, after which a potential relay operates to reduce the charging current to 70 amp.; a conditioning charge of 30 amp. also is available. In the G.E.C. equipped locomotives the charging is effected through a series resistance. The roof of the locomotive is removable in sections, so that the battery crates can be lifted straight out.

Extending over a length of almost $54\frac{1}{2}$ ft., these twin power locomotives weigh 56 tons and have a top service speed of 30 m.p.h. They are equipped with Westinghouse air brakes and hand brakes actuating blocks on all wheels. At the moment only one E.M.B. motor-driven compressor is fitted, but space has been left for the installation of a second set should this prove desirable. The axleboxes are of the normal L.P.T.B. plain type. Both centre couplers and the normal screw coupling with side buffers are fitted, and when the coupler is in use the side buffers are hinged back over the top of the beam. The bogies, which weigh about 6 tons without motors, have a wheelbase of 7 ft., and are pitched at 31 ft. centres. The wheels are 3 ft.

XUM

NOTES AND NEWS

Italian Programme.—A decision has been reached to electrify, some time after 1939, the main line from Turin to Milan and Venice, the conversion work to be undertaken subsequent to that of the lines from Milan to Chiasso and Domodossola, the conversion of which has already been decided.

Armature Ball Bearings.—An interesting article on the lubrication of ball and roller bearings for electric motors, which contains *inter alia* a comparison between bearings lubricated on the oil-bath, oil-drip, and grease methods, is printed in the *Ball Bearing Journal*, No. 4, 1937, published by the Skefko Ball Bearing Co. Ltd.

Swiss Twin-Car Trains.—The Swiss Federal Railways have decided to place an order for a streamlined electric twin-unit railcar, which will mainly be used for excursion traffic and have seating specially arranged for this purpose. The car will have a length of 46·2 m. (152 ft.) and will tare 78 *tonnes*; it will have a maximum speed of 150 km.p.h. (93 m.p.h.). It is to be shown at the Swiss National Exhibition in 1939 at Zurich.

The G.E.C. in 1937.—Among the traction orders received during the past 12 months by the General Electric Co. Ltd. is one for 812 traction motors of 170 h.p. for the L.P.T.B. new high-speed tube stock. Equipments of the remote control type with fully automatic acceleration are being supplied to the Glasgow subway, and six special battery locomotive equipments to the L.P.T.B.

Crompton-West Activities in 1937.—Among the traction work done for home railways were the electrical equipment of 64 two-car trains for the Tyneside lines of the L.N.E.R. (through Associated Manufacturers of Electric Traction Equipment Limited). An order for 800 traction motors was received from the L.P.T.B., and, *via* B.T.-H., a large order for control equipments for delivery over the next few years to the L.P.T.B.

Metro-Vick in 1937.—During the year, the first section of the £3,000,000 Central Railway of Brazil electrification was opened, and the Warsaw conversion on the Polish State Railways (carried out by Metro-Vick in conjunction with the English Electric Co. Ltd.) was finished. An order for 52 metadyne equipments for the L.P.T.B. was partly completed, and 42 double-bogie 1,200-h.p. locomotives for South Africa are being built.

Rand Electrification.—Such progress has been made with the conversion of the lines of the South African Railways in the Rand that it is expected that during the present month the local passenger service between Randfontein and Springs, through Johannesburg and Germiston, will become all-electric. The distance is about 70 miles. Electric services over various parts of the route have been introduced during the past 12 months.

Mountain Railway Electrification.—The rack railway from Glion, above the Lake of Geneva, to the summit of the Rochers de Naye, is at present being electrified. This line, on the 80 cm. gauge, is 6·2 km. in length, and was opened in 1892. It has a considerable winter sports and summer excursion traffic. The starting-point, Glion, is reached from Territet by a cable railway opened in 1883, and from Montreux by a rack line, electrically worked since its opening in 1909, over which through coaches are run from Montreux to the Rochers de Naye. Electrification is to be completed by next spring.

Further Electrification in Poland.—The Polish Ministry of Finance has denied a statement which was published on January 5 in the *Gazeta Polska* that an agreement had been concluded between the Polish Government and an English financial and electrical group for additional electrification work in the Warsaw district and other parts of of Poland at an estimated cost of £5,000,000. A new electrification contract is under discussion with this group, and it is understood that although satisfactory progress is being made, there are still questions to be settled.

Italian Speed Effort.—It is claimed that in the first week of December a special run for the benefit of a party of French engineers was made between Rome and Naples with one of the three-car streamlined electric trains of the Italian State Railways (see issue of this Supplement for July 23 and August 20, 1937), and that an end-to-end average speed of 150 km.p.h. (93·7 m.p.h.) was maintained over the distance of 134 miles, and a top speed of 201 km.p.h. attained. This is equal to 124·9 m.p.h., and not 126 m.p.h. as given wide notice in the general press. Nor is it a record, being 5 m.p.h. slower than the speeds attained about 33 years ago in Germany.

Unusual Light Motor-Coaches.—A new type of light motor-coach has been put into service on the metre-gauge Biel-Meinisberg Railway in Switzerland. It is of the double-bogie type with two motors driving all four axles. Each bogie carries one motor, which not only drives the second axle through gears, but whose casing forms an integral part of the bogie frame structure, and also the pivot castings. There are no axleboxes, properly speaking, the axle bearings being incorporated in the motor casing. The car has 36 seats and 24 standing places within a length of 45 ft., and on a tare weight of 13·5 *tonnes*; the wheels are only 26 in. in diameter.

World Power Conference.—A sectional meeting of the World Power Conference is being held in Vienna from August 25 to September 2 next. The only part of the programme directly affecting railways is section E, covering the supply of energy for electric railways. The British National Committee, under which participation from this country is organised, has its headquarters at 36, Kingsway, London, W.C.2. Among the members of the Austrian National Committee who are organising the summer meeting are Ing. Ernst R. Kaan (Vice-President), Chief Electrical Engineer, and Ing. Emmerich Karner, Chief Mechanical Engineer, of the Austrian Federal Railways.

Electrification in Estonia.—The Estonian State Railways operate an all-electrified suburban passenger service between Tallinn, the capital, and Pääscülo, a small residential town 11·2 km. (7 miles) distant. The line serves eight communities, chief of which is Nömme, 7·9 km. (5 miles) from Tallinn. An average speed of 50 km.p.h. (31 m.p.h.) is maintained with a maximum speed of 70 km.p.h. (43½ m.p.h.). Power is drawn from an electric generating station at Elema, 40 km. (25 miles) from Tallinn, at 3,000 volts, and is transformed and fed to the power motors at 1,500 volts d.c. The yearly current consumption is 2,000,000 kWh. With 52 trains a day in each direction, the number of passengers carried during recent years is as follows: 4,817,614 (1934), 5,000,048 (1935), 5,376,459 (1936). An average train on the Tallinn-Pääscülo run consists of one motor-coach and three to five trailers.